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COMPARATIVE RESULTS IN SUPRAPUBIC AND PERINEAL PROSTATECTOMIES.[*]

By John Martin Gile, M.D., Hanover, N.H.

Probably no operative procedure that has in recent years come into the field of surgery gives greater improvement, with practice, in its mortality results than does that of removal of the prostate. Hence, in giving one's statistics in this disease, it should be noted whether it is the first 50%, the last 50%, or all operations performed that are being recorded. It is, then, proper for me to state that the following figures include all my operations up to the present time.

In making this report of operations for the removal of the prostate, it must be clearly understood that I do not write as a genito-urinary specialist, but simply as a country surgeon, who, through force of circumstance of location, has been obliged to do the operation for such cases as were not able to secure more highly skilled aid. I realize that the number of cases that I shall report is so pitiably small that I cannot claim great value for conclusions drawn. I have doubtless missed many fine points in procedure, and have arrived at such results as I have secured by more or less bungling and individual methods.

The total number of cases operated on is 62. Of these, 24 were performed by the suprapubic route and 38 by the perineal. Among the 24 suprapubic operations there were 11 deaths; in the 38 perineal operations there were four deaths; a total of practically 24% of fatalities for all operations, and a fatality of nearly 46% in the suprapubic cases and 10 1/6% for the 38 perineal cases.

Of course, the obvious answer of those who advocate the suprapubic route is that I do not know how to do that operation, and modesty forbids me from replying that I do. In my earlier operations this was the method of choice, as it seemed to me better surgery and the more visible procedure, but discouraged by my results, I turned to the perineal course. My first impression, however, of the advantages of the suprapubic route remained so strong that I later did two more series of cases suprapubically, and though the results improved as compared with the first series, they were still far below that of the perineal cases, with the result that I am now so firmly convinced of the advantages of the perineal route, so far as my own operating is concerned, that nothing but a very exceptional case would make me willing to return to the suprapubic procedure.

Functional Results. Of the 47 cases that recovered, there were 42 perfect functional results. Of the five imperfect functional results one had a permanent abdominal sinus, this, of course, being a case of suprapubic operation. Two other suprapubic cases required secondary operation for closure of abdominal sinus, this procedure giving final perfect result, and so are classed with the 42 functional cures. Of the five imperfect results, two had slight, but permanent, perineal sinuses, leaking occurring only at time of urination. Both, however, were in cases of malignant disease of the prostate. One had rectal fistula, this also a malignant case. One perineal case at last report had a partial incontinence of urine, and this was the only non-malignant case of the perineal series that failed of perfect functional result.

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[*] Read at the inaugural meeting of the New England Surgical Society, Boston, Oct. 6, 1916.

Complications. In the entire series there were six malignant cases, and in all these, I believe, there was recurrence of the malignancy, although several lived for some years and died of some intercurrent disease. Of the three perineal malignant cases, two, as noted above, had permanent perineal sinus and one a permanent rectal fistula. One suprapubic malignant case made temporary perfect functional recovery but died of bladder recurrence. Two cases were complicated by stone in the bladder, and one case was followed by stone in the bladder, which was removed three months later. This case was done by the perineal route, and I am not absolutely certain that the stone was not present at the time of the first operation; perhaps one argument against the perineal procedure, but careful sounding ought always to rule out this danger. One case had non-malignant polyp of the bladder and one had widespread malignancy of the bladder, but this, curiously enough, made temporary normal recovery from the operation.

Incidence of Convalescence. In the cases that recovered there were two—one perineal and one suprapubic—that suffered with pretty severe infection following the operation. One perineal case had a severe hemorrhage into the bladder, the blood clotting and giving much difficulty in emptying it, but made final complete recovery. One perineal case had extensive scrotal infiltration with urine, which persisted for some weeks. One had late stricture, which was permanently relieved by passing sounds. Two cases in the course of recovery developed orchitis of brief duration.

Causes of Fatalities. In the cases of death I sometimes found it difficult to give the immediate cause, and I suspect that in most of the cases of death following the operation, a combination of arteriosclerosis, kidneys, and the general failure of function of old age would have to be grouped to state the whole case. Of the 15 cases of death in my records, two are put down as from exhaustion, an unsatisfactory and even unacceptable statement, and I suspect the combination alluded to above would more nearly state the fact. One died of pulmonary embolism forty days after operation, but having a sinus not quite healed. This was a perineal case, and perhaps I could fairly place it among the recovery cases, in view of the lateness of the event that caused death. I have, however, classed it with the four cases of death in the perineal operation. Two died of suppression of urine and resulting uremia. Three died of mixed pyogenic infections and one of tetanus. Three died promptly after operation, and are credited to surgical shock; these three were suprapubic operations. One died of hemorrhage a week after operation—a suprapubic case. One, a perineal case, appeared to die of dynamic ileus or intestinal stasis. This case was operated on in a hospital away from home, and was not under my later observation, and I suspect that the condition of the kidneys was an important factor in the death. One case died of a persistent vomiting that came on ten days after operation, and the whole clinical picture was that of cancer of the stomach with pyloric stenosis. The operative area was free from infection and apparently doing well in every way and the action of the kidneys unimpaired. No autopsy was secured, hence I cannot verify the suspected diagnosis of cancer, and have classed the case among those of death from operation. It was a perineal case, and should I give myself the advantage of the doubt in this and the case of late embolism, my operations by this method would show 5¼% fatality.

Age Incidence. The age incidence of the disease in the cases operated on was as follows: 1 between 30 and 40, 10 between 50 and 60, 35 between 60 and 70, 15 between 70 and 80, and 1 between 80 and 90.

Age did not appear to have much influence in the question of recovery. Of the cases operated on between 50 and 60, there was a fatality of 33%; of the cases operated on between 60 and 70, a fatality of 17%; of those operated on between 70 and 80, a fatality of 26 2/3%; while the one operated on between 80 and 90 made recovery. I should feel, however, that the numbers were so small that no valid conclusion could be arrived at in regard to age danger.

Time of Healing. The average time for complete healing of all cases was 28 days, excluding the four cases that had permanent sinus or fistula, and three of these, as stated above, were malignant. The quickest complete closure occurred in 11 days, and was a suprapubic operation. The longest that healed without secondary operation was 52 days and was also a suprapubic operation. The average time of healing in the two methods of operations was practically identical.

All cases were operated under general ether anesthesia. The point of opening the urethra has seemed to me to be of little consequence, since its only object is to allow of the introduction of a tractor, with which to draw the prostate within operative reach. For drainage in the perineal route in my earlier cases I used a double tube through the perineal opening, but more recently have used a single tube through the perineum and a catheter through the urethra, and until any oozing of blood has ceased, I have kept a constant slight flow of saline solution passing in through the catheter and out from the perineal tube, thus avoiding the danger that I once early encountered, of having blood collect in the bladder. A moderately firm gauze pack is also used around the tube in the perineal incision.

The selection of cases for operation has depended more on the need of the patient than on the favorable or unfavorable condition of the case. In other words, infection of the bladder, pain and discomfort on the part of the patient or the impossibility of voluntary or catheter emptying of the bladder have been the indications that have most often determined operation. Hence, I assume that I have not operated on an unusually favorable group. To follow rigidly any test of kidney efficiency will, it seems to me, rule out of the operative class considerable numbers of favorable cases, whereas where kidney efficiency by test seems good, the case may for other reasons be a most unfavorable one. In general, any active process of nephritis appears to be the most important contraindication. The average of 28 days for healing the sinus appears rather long, and this time may be due to some failure in my technic. On the other hand, when the size of the pocket is considered that is left by the removal of the prostate I do not know that this is an unusually long time for its granulation.

It would be unwise to attempt to draw any absolute conclusion from so small a series of cases. Any aptness that I have is evidently for the perineal route, and without attempting to make further deductions than those already implied, I will leave these statistics for your consideration and criticism.

DISCUSSION.

DR. JOHN H. CUNNINGHAM, JR., BOSTON.—I have listened to Dr. Gile's paper with much interest and can understand perfectly the type of patient which has come under his care, and feel that he should not be disturbed at his mortality under the circumstances. What must be clearly appreciated in connection with prostatic patients is that they are elderly persons, past the prime of life, who suffer not only from the results of changes in the urinary system dependent upon the obstruction to the outflow of urine, but that there are usually other important degenerative changes in all body tissues, especially in the circulatory and respiratory systems, which impair the resistant power of the individuals and render them poor surgical risks.

Having been interested in the subject of prostatic surgery for many years, I have come to the conclusion that it is more difficult to appreciate the patient's general condition than it is to have a complete and accurate knowledge of the urinary system. It is a relatively simple matter to gain an accurate knowledge of the local condition by the exact procedure of urinalysis, cystoscopy, renal function test, roentgenology, etc., and to estimate with precision the nature of the prostatic obstruction, and the vesical and renal changes dependent upon it. It is far more difficult to estimate the degenerative changes in the general condition of the patient, even by employing the more recent tests of estimating metabolic changes.

Pre-operative study, both local and general, and the employment of pre-operative measures prior to operation to improve the reserve power of the individual patient, is the most important advance which has been made in prostatic surgery. It is the employment of these pre-operative features that has led me to the conclusion that there is no one operation applicable to all cases, and the day has passed when we shall continue to vacillate between the suprapubic and perineal routes through the domineering personality of individuals who have acquired perfection in the technical performance of any special operation. Personally I have come to classify prostatic patients according to their general condition, rather than by the prostatic obstruction, in the consideration of the proper operation for the individual patient. As the Doctor has pointed out, his mortality is lower by the perineal route than by the suprapubic. It has long been established that the perineal route is much safer than the suprapubic. There is no advantage in the suprapubic route over the perineal, except that there is a better average functional result. Speaking broadly, the perineal results are not so good, yet on the other hand, there are those who are especially skilled in the performance of the perineal operation who will have quite as good functional results and a much lower mortality.

Pre-operative preparation of the patient's general condition by appropriate general treatment and improvement in the urinary system by bladder drainage, either by the urethra or suprapubic cystotomy, whereby local infection and renal impairment is improved, has lessened the mortality in both the suprapubic and perineal operations, yet the suprapubic route still carries the higher mortality.

For my own part I have chosen to employ the suprapubic operation in the group of cases in which the general condition of the patient shows no serious impairment and the kidneys have been proven not to be seriously damaged. This group forms the better class of prostatic patients and we may impose a greater operative tax upon them with safety for the purpose of obtaining a better average functional result. The group which does not come up to a certain standard are operative by the perineal route because the operative tax imposed is the least of all radical methods.

There is still another group in which the general condition will not allow the employment of any radical procedure, in which we must do something to relieve the distress dependent upon the urinary obstruction. Certain patients in this group may be subjected to the galvano-cautery operation of Bottini or the so-called punch operation done under local anesthesia, which procedures are often followed by excellent results. There still remain patients in this group in which the type of obstruction renders these operations of no value. These patients had best have a permanent suprapubic cystotomy for the remainder of their days, unless it is possible for the individual to carry out regular catheterization under approved conditions.

As I have briefly indicated, it is my opinion that it is the pre-operative study and improvement of the individual patient's general and local condition, and the estimation of the individual's vital forces which is to become the fundamental basis upon which operative procedure must be based; and, according to the finding, one comes to believe that there is no one operation suitable for all prostatic patients, and that we will learn to choose the particular operation best suited for the individual case.

Dr. Frederick B. Sweet, Springfield: With Dr. Cousins, I feel very grateful to Dr. Gile. I had begun to feel that I was the only surgeon who ever lost a prostate case. My experience as to method of procedure has differed from that of Dr. Gile. I began with the suprapubic route, then for a time did the perineal operation, and three years ago went back to the suprapubic.

My chief reasons for abandoning the perineal operation were its higher mortality, more frequent distressing late complications, and especially because so large a percentage of cases who had filthy bladders continued to suffer from them afterwards, necessitating secondary operation or other treatment. Since returning to the suprapubic method, I have been doing the two-stage operation after the technic of Pilcher. You are all familiar with it and his reasons therefor.

Cystotomy with the tying in of Pezzer catheter under local anesthesia; a delay while the kidneys recover from the effects of the decompression and the bladder cleans up; the removal of the prostate as the final step.

One is often strongly impressed by the very great subsidence of the congestion in the prostate and bladder at the time of the second operation. There is also generally much less hemorrhage incident to the removal of the gland than when the operation is completed at one sitting. My own operative mortality in this condition has been cut in half by the two-stage procedure.

Dr. John W. Keefe, Providence, R. I.: With reference to the removal of the prostate, I believe that we should not say that we will do only suprapubic operations, or say that the perineal route alone is sufficient. I think there are types of prostates that should be removed by one method and types by another method. If the tuberosities of the ischium are far apart, Young's operation may be the choice, especially if you find that the prostate has a tendency to bulge toward the rectum. Where we are dealing with a large middle lobe, with a tendency to enlarge toward the interior of the bladder, the suprapubic route would be the one of election. (Illustrations on blackboard.) With this type of case you are working at a great distance from the perineum, hence the suprapubic, then, would be far preferable. During the last two or three years I have employed the suprapubic route more freqently than the perineal. I believe that the two-stage operation accomplishes a number of things. We can do the suprapubic operation with the use of novocain and adrenalin, thus avoiding a general anesthetic. I believe that the blood pressure amounts to very little. The sulphonephthalin test we have laid too great stress upon. The general appearance of the patient is better than any laboratory test. If a man has a dry brown tongue and an anxious countenance, wait and see if his condition will improve. Under novocain anesthesia, make a suprapubic opening in the bladder and place a Pezzer catheter so as to drain this viscus. When we make a wound in an individual there is a reaction, and in these cases we have the reaction following the suprapubic operation; I believe the patient is immunized to a degree,—immunized if we wait ten days or a week before attempting the operation for the removal of the prostate. The patient has but little disturbance. At the second operation, you have merely a sinus in the bladder; by pressure you can enlarge that and enucleate the prostate. It can be readily done with the finger, without shock to the patient.

The prostate reduces in size from the time of the primary operation during the ten days to five weeks of drainage.

The two-stage suprapubic operation has proven to be one of great value.

Dr. Stephen A. Mahoney, Holyoke: My experience with prostatectomy has been a little bit stormy. I started off by the perineal route, and after several years of that method I thought I was fairly skillful, and was unfortunate to go to Baltimore and watch Dr. Young. His operation seemed so simple. When you try to do it yourself it is different. The only difference was that the anatomical structure that Dr. Young brought out so clearly did not appear in your operations at all. After doing his operation, with 50% mortality, I dropped the method. In two emergency cases I started in by doing the suprapubic operation. I had to do a suprapubic cystotomy. After I got the bladder cleaned up, I went through the suprapubic opening and did the suprapubic prostatectomy. They were such poor risks, but with recovery so smooth, that since then I have been doing the suprapubic operation almost entirely. I think the mortality by the suprapubic is decidedly better. The only bad result I have seen was a case operated upon in a neighboring city, leaving a resulting suprapubic sinus of eight months' duration, that cleaned up by doing a meatotomy and dilating the stricture, thereby letting larger sounds into the bladder.

CONCLUSION OF DISCUSSION.

Dr. Gile: The cases of very great discomfort are usually also the cases of great danger, either with or without operation —a danger that often appears to be pretty evenly balanced. In such cases, I believe we are under the definite obligation of operating for relief, even though a chance of raising our average of fatality is more than even. Unless we look over our records in any operation that we have been doing over a considerable series of years, our mere guess as to the per cent. of fatality we have had is not of much value. In this particular operation, until I reviewed my cases I had no idea that my results were so bad in the suprapubic operations, and should guess that they were rather worse than they proved to be in the perineal.

I should be glad to know of the results secured by accurate computation on the part of those who have done both operations an approximately equal number of times. I realize that I have laid myself open to criticism in stating that the point of entry into the urethra seemed to be of little importance. I can support it simply by saying that where difficulty was found in dissecting back to the recognized point of election, I have several times opened this canal farther forward, and those particular cases have made as favorable recovery as others.

A METHOD OF SUPPORTING THE BLADDER IN CERTAIN CASES OF CYSTOCELE.*

By Herbert L. Smith, M.D., Nashua, N. H.

The procedure to be described—I should hardly dignify it with the name of operation—is a very simple method of supporting the bladder in certain selected cases of cystocele. The principle is, indeed, so very simple, in fact so almost absurdly obvious, that when it first suggested itself to me in the course of an operation, I could not believe it had not been used before; even now, although I have found no reference to such a technic, either in the text-books or such articles as I have been able to consult, and although all the operators with whom I have discussed the matter have said that it was as new to them as it was to me, I still think it must have occurred to some one long ago. Perhaps some of you may be able to inform me that the method has already been tried out and found wanting. However, as the results, though too few in number and too recent in date to permit of positive assurance, have in a certain restricted class of cases given me much satisfaction, I have felt it proper to offer you the suggestion for what it may be worth.

The method consists, in a word, in attaching the uterus to the posterior-inferior surface of the bladder, the cervix being sutured firmly to the posterior wall of the urethra, just above and behind the meatus. By this manoeuvre the bladder pouch is tucked up into the pelvis, and the bladder as a whole rests upon the anterior wall of the uterus as upon a shelf—just as it does upon the posterior wall of the uterus in the interposition operation. (See fig. 3.)

The first and obvious criticism of such a utilization of the uterus as a support for the bladder would be the fact that, in so doing, the uterus would be carried out of its normal plane, and that the disadvantages attendant upon the resulting retroversion would offset any good effects upon the cystocele. The answer to this is, I suggest, that in the rather restricted class of cases to which I should consider the operation applicable, this retroversion would either not be possible or could be entirely disregarded.

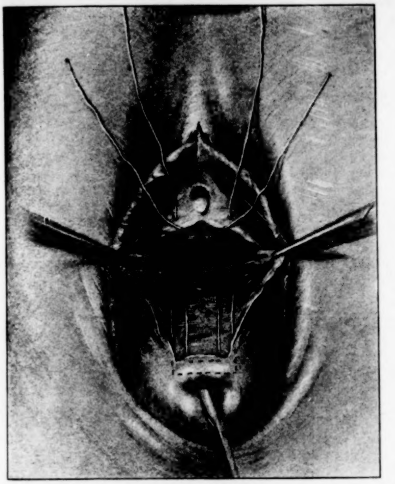

Fig. 1. Showing denudation of cervix and cystocele, and sutures applied through edge of triangular ligament which has been dissected free. Silkworm gut has been used by the author, and no uniform method of placing the sutures has been followed, but care has been taken to get a good bite through the dense structures of both cervix and ligament.

I first employed the method about eight months ago in an elderly woman who had already undergone an abdominal operation with fixation of the uterus, but who suffered much from a cystocele, which the operation had not relieved. She declined any extensive procedure, and I decided to give her as much relief as possible by a plicating operation upon the anterior vaginal wall. After the bladder pouch had been dissected free, it occurred to me that, instead of bringing the parts together laterally, making a line of sutures running lengthwise of the vagina, it would be easy to bring the cervix forward and attach it close up to and behind the urethral meatus, then suturing the mucous membrane on each side, the line of closure running out laterally from the cervix across the vagina. By this means the bladder protrusion was tucked up nicely out of sight so that the cystocele area and base of the bladder rested upon the uterus. (See fig. 2.) The result was, and has

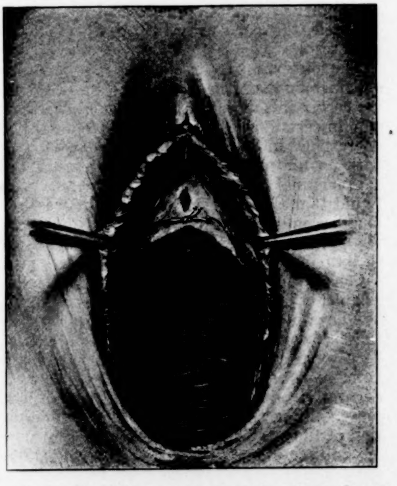

Fig. 2. Showing position of cervix after tying sutures. In some cases the cervix has been amputated as a preliminary step.

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* Read at the inaugural meeting of the New England Surgical Society, Boston, Oct. 6, 1916.

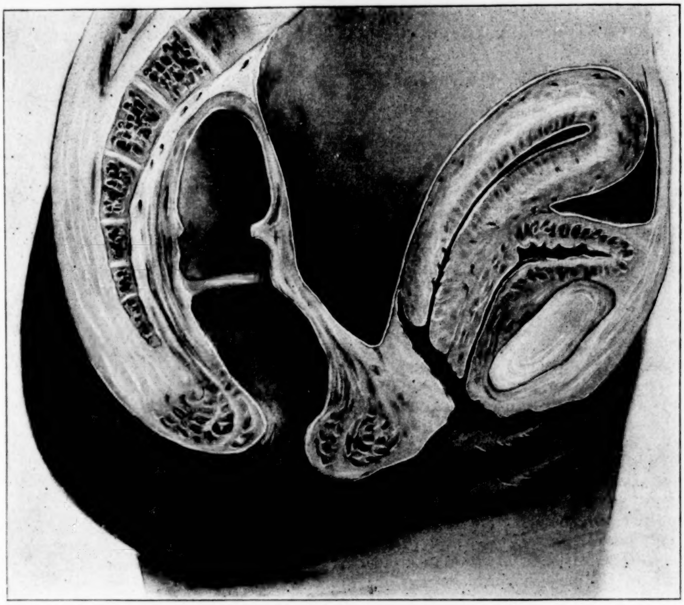

FIG. 3. Showing obliteration of pouch between anterior lip of the cervix and bladder. In this illustration the fundus is supposed to have been suspended or fixed to the anterior abdominal wall.

remained, perfectly satisfactory to the patient and operator, all symptoms being entirely relieved. In two other cases, similar to this, where a previous abdominal operation, with one form or another of fundus support, had not cured the cystocele, the same procedure has given equally good results.

The outcome of these cases was so entirely satisfactory that I have ventured to fix the uterine cervix in the way described as a preliminary step in certain selected cases of abdominal pelvic operations. In one case of a large fibroid uterus, with an unusually large bladder hernia, where supravaginal hysterectomy was done, it was found that the cervix, attached as it was to the bladder, pulled that organ well up into the pelvis when the round ligaments were attached to the stump. Today, seven months later, the conditions are absolutely perfect and the relief complete.

I have now performed the operation eight times. Two of these are recent. The others have been seen or heard from after periods ranging from five to eight months. None show the slightest tendency to recurrence of the bladder pouch—in fact, judging from the present position of the organs, and of the unyielding nature of the tissues on which the bladder rests, I cannot conceive how a cystocele can re-form in any of them. Practically all the cases had a great relaxation of the pelvic floor, with marked rectocele and in all cases a careful perineum operation was performed. As a majority of the patients operated upon were over sixty years of age, it was considered that, even if the fundus of the uterus should become displaced backward, that organ would, at the worst, rest more or less horizontally as a sort of bridge between the meatus in front and the repaired perineum behind, and that no extensive prolapse could occur. One elderly woman, whose age and general condition forbade either abdominal intervention or any operation requiring considerable time, shows now a fundus somewhat backward, but the organ is not large enough to produce rectal irritation, and the bladder symptoms are entirely relieved. Another patient, whose cervix was unusually long, while absolutely free from symptoms, was at first somewhat disturbed by the fact that she could feel the os in the vagina and feared that the old prolapse was recurring. An inspection showed that the attachment to the bladder was firm, and she declined to have the extra half inch of cervix removed.

There are several classes of cases in which the procedure I have described would seem to be indicated:

1. Very aged or infirm women, where a pro-

longed vaginal technic or abdominal section would not be safe.

2. Cases where the uterine body is already high up in the pelvis as the result of previous operations, but without relief of the cystocele.

3. Cases where the body of the uterus has to be removed, as in the case of uterine fibroids already described, and in which the bladder has become so stretched that merely supporting the stump from above will not iron out, so to speak, the cystocele pouch.

I need not say that the device here described should not be used universally or indiscriminately. The operations of Duhrssen, Goffe and Truesdale, and others, and the many modifications or combinations of them, will be used for the greater proportion of cases. There will still remain, however, or at least I conceive it so, a very considerable number of cases, usually rather hard to manage, in which this use of the uterus as a bladder support will be found advantageous and will afford an easy and safe means of giving relief to a most distressing condition.

ADDENDUM.

In a series of cases operated upon since the above paper was read a more exact method of suturing the cervix to the tissues below the meatus has been worked out. On a more careful dissection of the tissues it became apparent that the firm structure to which the uterus had been fastened was that band of the triangular ligament which runs below the urethra and spreads out laterally, in a fan-shape, to the pubic bones. (See fig. 1.) This ligament is very firm and inelastic, and no pull exerted upon it in any way appears to disturb the bladder or urethra. This fact is sufficient to explain the lack of symptoms which had rather surprised me in the earlier cases.

The unyielding nature of this structure also gives me additional reason to believe that when once a firm union has taken place between the dense tissue of the cervix and that of this ligament, the support of the bladder thus afforded by the uterine body will be permanent.

Since the reading of this paper eight additional cases have been operated upon, making now, sixteen in all. In one of these the union between the cervix and fascia was imperfect, apparently due to some constitutional condition, since an operation for ventral hernia in an old scar, undertaken at the same time, was likewise unsatisfactory. In this case, however, the symptomatic result is perfect at the time of writing, as the uterus was suspended, and there was sufficient union of the fascial flaps to obliterate the bladder pouch. Should this stretch out in the future it will be a simple matter to denude and suture the cervix once more to the triangular ligament. As the fundus is firmly attached above, the result, assuming that union takes place on the second attempt, should be as good as has been secured in all the other cases.

DISCUSSION.

Dr. William P. Graves, Boston: Dr. Smith's operation seems to me a very ingenious, and I am sure, a useful one. I have never seen the operation described in literature, and I think that Dr. Smith may safely assume the credit of having invented it. He speaks of its possible disadvantages in causing a retroversion of the uterus, and in this connection I wish to bring out a point which doesn't seem to be well known.

The uterus after the menopause is always retroverted in the second degree, so that its axis is coincident with the axis of the vagina. Therefore, inasmuch as this operation is recommended only after the menopause, it would not seem that any harm could be done by bringing the cervix forward. The operation is apparently especially applicable in those cases of elderly women where cystocele is present without prolapse of the uterus. In cases of this kind pessaries are often of little value, as the bladder is apt to come down past the support. If there is prolapse of the uterus, or if the uterus is heavy, or if the patient has not reached the menopause, I doubt if the operation is feasible. In younger women if the uterus should be pulled forward, as in Dr. Smith's operation, retroversion would result and possibly a later prolapse.

I favor the idea of this operation in the cases for which Dr. Smith recommends it, and I should be greatly interested to hear the later report from Dr. Smith as to the eventual outcome of his cases.

Dr. Herbert L. Smith, Nashua (closing): I have nothing more to say except that I should limit the operation to certain definite cases, as Dr. Graves has said.

The history of one case impressed me much. It was that of an elderly woman who had the care of invalid husband, whom she had to lift. She had been operated upon by abdominal section, and the uterus was suspended, but the cystocele remained. She begged for relief from her surgeon, a well-known Boston operator, who told her that no other operation would do any good; that the cystocele would stretch out again. He advised her to have a pessary applied. That did her no good. She was referred to me, and I decided to try this expedient. Now she says she "does not know she has a bladder." The most interesting thing of all was that, whereas I feared the weight of the uterus might pull on the urethra or bladder, she has had no urinary symptoms from the moment of the operation; and I might add, a similar freedom from discomfort has been noted in all cases operated upon up to the present time.

DIAGNOSIS OF EXTRAUTERINE PREGNANCY.*

By Garry DeN. Hough, M.D., New Bedford, Mass.

Tubal pregnancy presents itself to us in one of two ways—either as an ordinary case of pelvic disease or with symptoms due to rupture of the gestation sac and consequent hemorrhage.

The latter condition may constitute one of the gravest of surgical emergencies and demand immediate operation. Very exceptionally the bleeding may cease, the effused blood be absorbed and the patient recover. Less rarely the hemorrhage ceases for a time, but recurs, and then the recurring bleedings may be fatal, or the case may become one of another type, to be considered in a moment.

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* Read at the inaugural meeting of the New England Surgical Society, Boston, Oct. 6, 1916.

The typical picture is that of a sudden, acute abdominal lesion, plus an internal hemorrhage. Such a symptom group in a woman of childbearing age should suggest a ruptured tubal pregnancy. The first symptom is a sudden, severe pain in the abdomen, often accompanied by vomiting. The patient almost at once feels extremely faint and ill. She is perfectly conscious and remains so. The abdomen is often distended and rigid, and it becomes excessively tender. A gradually increasing pallor of the surface is soon noted. The pulse becomes rapid and weak without at first, any rise of temperature. The patient feels more and more faint, but her pains may entirely disappear. She becomes restless, sighs deeply, yawns, the pulse becomes weaker and weaker, finally imperceptible, and gradually she sinks, maintaining a perfectly clear mind to the very last.

There are a few special points that merit attention:

1. Previous history. If before the beginning of the attack, the woman had symptoms of an early pregnancy or had pelvic pain associated with some menstrual abnormality these things are highly suggestive. The absence of these points from the history is of no value whatever as negativing the diagnosis.
2. At the moment of the attack the patient is, as a rule, in good health. This makes it unlikely that we have to do with a perforation of the stomach or bowel or with the rupture of an internal abscess or of a suppurating cyst.
3. The abdominal tenderness is very apt to mislead, for most of us have the fixed idea that abdominal tenderness always means an inflammatory condition, which is a grievous error. There are at least three intra-abdominal accidents, not inflammatory, that are associated with marked tenderness,—twist of the pedicle of an ovarian cyst, ruptured ovarian cyst and ruptured tubal pregnancy.
4. Free fluid in the abdominal cavity is but rarely discoverable.
5. Pelvic examination is usually negative. The most that we can expect to find is tenderness and possibly a feeling of fullness and bogginess in the pouch of Douglas.

The other type of case where the gestation sac is ruptured is that of small, recurrent hemorrhages. The patient will tell you that, a few months ago, she thought that she was pregnant, but that when, if pregnant, she was some two or three months along, she one day had a rather severe abdominal pain, perhaps associated with faintness, and that since then, from time to time, she has had similar but less severe attacks. She has now more or less constant pain and distress. Perhaps she has noted a tumor in the lower abdomen. We find some tenderness of the lower abdomen and of the pelvis. The tube may or may not be palpably enlarged. There is usually some rise of temperature, at any rate toward night.

Quite different from the above are the cases in which the gestation sac has not ruptured. In this group we find four types of history, either of which should suggest tubal pregnancy.

1. The pelvic pain type. She says that she is pregnant, has skipped one, or two, or even three periods, but that she is troubled with cramps or colicky pains low down in the abdomen. On particular investigation we find that this pain is in the region of the uterus and of one tube.
2. The abnormal menses type. She says that she does not know whether or not she is pregnant. Either she has had one or two abnormal periods or she has skipped one period, and had one which was abnormal. Rarely, in such a case, is the possible pregnancy as far along as three months. The menstrual abnormality consists of one or more of the following symptoms: (*a*) the flow was not at the proper time, but either earlier or later than normal; (*b*) the duration was less than normal; (*c*) the quantity was less than normal; (*d*) the color was paler than normal. In addition to the menstrual abnormality she will, as a rule, have had the pelvic pain described under the previous type.
3. The miscarriage type. She says that she thinks she is having a miscarriage. Rarely is such a case as far along as three months. Usually she will have had some of the symptoms of the pelvic pain type or of the abnormal menses type. Microscopical examination of what has come away will show that there are no fetal elements in it, and so settle the diagnosis.

If the history is that of either of these three types, the diagnosis can usually be made. Look for the signs of pregnancy, particularly the changes in the mammary glands, discoloration of the vulva and vagina, softening of the cervix, and intermittent uterine contractions. Remember that none of these are as well marked as in normal pregnancy. Some women always have, at a very early period of their pregnancies, certain peculiar feelings, differing in different persons, but constant for each individual, which let them know the condition of things. In multiparae, particularly in those who have had several children, such symptoms should be enquired for. Their presence should be given due weight; their absence, however, is of no negative value.

On pelvic examination we find that the uterus is almost always pushed to one side, sometimes very much so, and is smaller and harder than at the corresponding period of normal pregnancy. We also find at one side of the uterus (sometimes on both sides) or in the cul-de-sac of

Douglas a soft sausage-shaped or ovoid tumor, which is the pregnant tube.

4. The hospital type. This includes the neglected cases of the other types, and is, perhaps, the type most commonly met with by us in hospital practice. The early history is apt to be one of pelvic pain, abnormal menstruation, perhaps of a miscarriage or of small recurrent hemorrhages. Whatever it was at first, she is now evidently a decidedly sick woman, and is clearly growing worse. Fever, pelvic tumor (often of pretty large size) which may be so hard as to simulate a fibroid, or so soft that it evidently contains fluid (pus or blood), pain and tenderness, are the present symptoms. Diagnosis must usually depend almost wholly on the history, and, alas, is often impossible before operation. But though correct preoperative diagnosis may be impossible, the treatment is rarely in doubt, and rarely fails to clear up the case and result happily for the patient.

When a normal uterine pregnancy is associated with a tubal pregnancy, a diagnosis is highly improbable. A bilateral tubal pregnancy is also of such infrequent occurrence that it is almost invariably overlooked. The same is true of the interstititial variety of tubal pregnancy, or pregnancy in a rudimentary horn, in one horn of a bicornuate, or in one side of a septate uterus. That all of these curios do occur I can assert positively from my own experience. Perhaps, at our hundredth meeting, some one will be able to give explicit directions for the differential diagnosis of each.

EXTRAUTERINE PREGNANCY.*

BY RALPH H. SEELYE, M.D., SPRINGFIELD, MASS.

BECAUSE diagnosis is, in the last analysis, the most essential factor in medical practice is probably the reason why the consideration of ectopic gestation becomes one of the most fascinating problems with which the surgeon has to deal.

It has been most interesting to observe the development of knowledge on this subject, as many of us in our own professional experience have been able to do, from the extrauterine pregnancy as it was known twenty-five years ago, to the condition as it is known today. A quarter of a century ago a woman who bled to death from a ruptured, impregnated fallopian tube presented sufficient evidence to warrant the diagnosis of ectopic pregnancy.

Frequent opening of the abdomen for conditions of lesser gravity revealed many a mistaken diagnosis, and not a few diagnoses of pyo-salpinx and appendicitis were changed to extrauterine pregnancy. Even at the present time it can probably be truthfully stated that more errors are made in the diagnosis of ectopic gestation than in any other abdominal lesion.

To follow the prescribed and accepted and altogether proper order of things in the consideration of medical subjects, however, the causation of this condition must be first considered.

It is obvious that there must be some pathological change which affects the fallopian tube in some way so as to prevent the free passage of the ovum into the uterus. Previous pelvic inflammatory disturbances, ovarian, tubal and uterine tumors may be considered as causative factors in about 60% of the cases (Graham). The other 40% show no particular abnormality. It is even stated (American Text Book of Gynecology) that in some cases of ectopic gestation the microscope has disclosed no deviation from the normal in the epithelium of the tube. When we take into consideration the very large number of minor as well as major abnormalities that are found in the daily routine of pelvic surgery, it inclines one to hesitate in declaring with much positiveness that these abnormalities are to be held responsible for the failure of the ovum to reach the uterus. Until more light is cast upon it the aetiology of ectopic gestation must continue to be shrouded in uncertainty.

The pathology of this condition is, however, much more readily understood. As the ovum develops, the wall of the tube becomes gradually thinned by the growth of the villi into its surface so that usually in the early stages rupture occurs, or less commonly the ovum escapes, or partially escapes from the distal end of the tube; or, in some instances, as we are informed, when it is located near the uterus the ovum enters that organ.

When the tube ruptures, the ovum may or may not enter the abdominal cavity. If it does, conditions may be such that the placenta attaching itself to contiguous structures develops its circulation from them and allows the foetus to live and come to term. Two such cases I have seen, one of a brother practitioner and one of my own. They both died. My case was correctly diagnosticated by the family physician in a country town by palpation and the discovery that the uterus was small and only four inches deep. In this case the woman had felt motion until four days previous to operation. A dead child was found, a male, weighing 6½ pounds, lying in its membrane in the abdominal cavity. The placenta was attached all over the lower abdomen and pelvis in such a way that it was impossible to remove it safely. The membranes were stitched to the abdominal wall and the cavity packed. Sixteen days later she died of sepsis. This was twelve years ago. I wonder if with the constantly increasing improvement in abdominal work we would not today rather face the somewhat desperate procedure of removing the attached placenta than the likelihood of sepsis developing during the sloughing out of the placenta.

Haemorrhage accompanies the rupture of the tube, and therein lies the essential element in the pathology of extrauterine pregnancy. It is likewise the most important factor in the diagnosis, prognosis and treatment as well. It may be so slight as to cause practically no symptoms, or it may be so severe as to cause instant death.

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* Read at the inaugural meeting of the New England Surgical Society, Boston, Oct. 6, 1916.

The symptoms of extrauterine pregnancy up to the time rupture or tubal abortion occurs are so trivial that it must be very rare that a diagnosis has been made in that stage of the disease. No instance of it has come to my knowledge.

When rupture does occur, the haemorrhage may be so slight as to cause little disturbance. There is pain, mild or severe. A not constant, but very significant feature, is pain deep in the pelvis, often in the rectum, due to blood in Douglas's cul-de-sac. The more haemorrhage, the more pain. The most characteristic symptom is the slight, dark, bloody vaginal discharge which occurs, usually in from five to six weeks after the last menstrual period.

On the death of the embryo the uterine decidua loosens and may come away intact, but more often it loosens in shreds. This gives rise to this external haemorrhage, which must never be disregarded in arriving at a diagnosis of tubal pregnancy.

My experience has led me to the conclusion that the diagnosis of ectopic gestation may be confidently made on the presence of this occurence accompanied by pain. This is well illustrated by a recent case: A woman was taken with a moderately severe pelvic pain, accompanied by a dark vaginal discharge. She had gone ten days over her menstrual period. On getting this history, I said to the nurse: "This is extrauterine pregnancy." On examination, a rounded, symmetrical mass was found which was apparently the uterus enlarged to about the size it would be if two months pregnant. Diagnosis from physical examination, pregnancy with attempt at miscarriage. After a delay of a couple of days, during which the symptoms subsided, an ether examination disclosed a uterus enlarged by what was apparently a fibroid growth. Opening the abdomen a ruptured fallopian tube was found, plastered onto the top of the uterus. If I had stuck to my diagnosis made from the history, I should have saved one of the many mistakes I have made in the diagnosis of this condition.

On the other hand, and curiously enough while narrating the above case, I was interrupted to see a woman, who, five weeks after a normal menstrual period, had a scanty, bloody vaginal discharge, with moderate pain. She thought she was pregnant and had even attempted to induce an abortion upon herself. The bloody discharge was not as dark in color as is ordinarily found in extrauterine pregnancy. Examination showed only an enlarged, somewhat tender retroverted uterus. The diagnosis of ectopic gestation was made, only to be proved wrong in a few moments by discovering on abdominal section that the patient's diagnosis of pregnancy was correct. In spite of this case, in which perhaps the error was due to disregarding the too bright color of the vaginal discharge, the diagnosis must be allowed to depend largely upon the history of the patient.

Some years ago a nurse was brought to the hospital with the characteristic story of six weeks' delayed menstruation, scanty, dark, bloody discharge and pain. She stoutly denied the possibility of pregnancy, but the diagnosis seemed clear, and a ruptured impregnated tube was found.

Several of my cases have had flowing to a considerable extent, and have been curetted on the supposition that an abortion had taken place. Last winter a woman in such a condition was curetted by a friend of mine. He discovered at the time what he considered to be a small ovarian tumor, but not being an abdominal surgeon, did not open the abdomen. I saw her three weeks later suffering severely with abdominal pain and considerable general disturbance, with fever and accelerated pulse. The history of the case and the "ovarian tumor" made the diagnosis seem clear, and ectopic pregnancy was found.

I note one case which I curetted in 1903, and felt a mass in the left side, which was thought to be pyosalpinx. Two weeks later, to my chagrin, I found a ruptured, impregnated tube, with a large amount of blood clot.

In several of my early cases the diagnosis of pyo-salpinx, before operation, had to be changed to ectopic pregnancy at operation. This is not at all surprising, however, in cases that did not come to early operation, as was more frequently the case fifteen or twenty years ago. In those cases there was considerable secondary inflammatory action, with elevated temperature, accelerated pulse, abdominal distention and rigidity, and by vaginal examination a large, tender mass.

Occasionally one sees an inflammatory condition of such intensity as to present the picture of acute appendicitis, with general peritonitis.

I shall not forget the second case of extrauterine pregnancy which I operated upon. It was in 1896 that I was called 25 miles up into the country to see, in a farmhouse, an unmarried girl of 20, who on Monday was seized with a sudden pain in the right lower abdomen. On Tuesday she was up and about; on Thursday she drove five miles for a Thanksgiving dinner. That afternoon very severe pain in the right side developed. Her physician was called, and gave her morphia. She grew steadily worse, and on Sunday, six days from the onset of her trouble, I found her with a temperature of 103.8, and a pulse of 140, with abdomen greatly distended, rigid, and exquisitely tender. She was semi-conscious and gave one the impression that she would live but a few hours. She was also blanched. Inquiry brought out the fact that she was naturally pale and anemic. Almost against my judgment, I was persuaded by the mother to operate in the face of impending dissolution. An incision over the appendix revealed the abdominal cavity filled with black blood clot. A median incision was made, and a ruptured tube removed. Large masses of clot were removed, the abdomen thoroughly washed out, and a drain inserted. A year later I was pleased to receive a newspaper clipping from the family physician announcing the engagement of Miss So-and-So to Mr. So-and-So.

The prognosis of ectopic gestation depends upon the treatment, and the treatment depends upon the diagnosis.

I find records of 49 cases of tubal pregnancy which I have operated upon. Four of these cases died. One was the full-term abdominal pregnancy already referred to; another was a woman operated upon twelve years ago for ovarian cyst—which she had—but in addition she had a ruptured tube, bound down behind the uterus with a mass of very dense adhesions. For some reason unknown she did not rally from the operation, and died the next day. The other two cases were women who were exsanguinated, and it is in this class of cases only that there is any occasion for discussion of the treatment of extrauterine pregnancy. My experience with these cases is not sufficient to warrant the drawing of authoritative conclusions. Nevertheless, I have been forced to the opinion that women exsanguinated from ruptured tubal pregnancy are not proper subjects for operation until the collapse attendant upon the hemorrhage and shock can be at least partly overcome.

Both of my fatal cases were in 1902. The first one was sent to the hospital three days after the occurrence of pain and collapse. She was markedly exsanguinated. The pulse was 140, and scarcely perceptible. A ruptured tube was removed, and with it a very large amount of blood clot. She did not rally from the operation, however, and died two days later.

A few months after this I was called up into the country to see a young woman who three days before had abdominal pain and bloody vaginal discharge. Three hours before I saw her, pain recurred. Her pulse was then 80. I found her blanched and pulseless. Five hours after operation she died.

I have always felt that if operation had been delayed until these two women had recovered somewhat from the effects of internal hemorrhage, their lives might have been saved. This opinion is substantiated by two similar cases which were treated differently.

Ten hours after collapse I saw a woman in a farmhouse, apparently dying—blanched, pulseless, sweating, unconscious, and scarcely breathing. Various methods of resuscitation having proved of no avail, I expressed my sympathy to the family and left her with her physician. Three days later she had recovered sufficiently to be brought to the hospital. Although markedly affected with hematogenous jaundice, her general condition was good. She withstood the operation well and made a good recovery.

Last winter a woman was sent into my hospital service,—blanched, collapsed, and almost pulseless from ruptured ectopic pregnancy. Her blood pressure was 60. Inability to procure a donor made transfusion impossible. The use of normal saline solution intravenously and subcutaneously, brought the blood pressure up to 100. At this point the operation was begun, the salt solution meanwhile being kept up. At the end of the operation the blood pressure was 110, and a good recovery followed.

Extrauterine pregnancy is, perhaps, as satisfactory a condition as the surgeon has to deal with, presenting as it does, the very nice problem of diagnosis, never lacking in interest, and offering an opportunity for immediate and practically certain relief without annoying sequelae and disastrous recurrences frequently found in other classes of cases.

DISCUSSION.

Dr. Frederick B. Sweet, Springfield: My experience with the condition under discussion has brought to me two very distinct impressions.

First: The difficulty, the great difficulty, of diagnosis before rupture.

Second: The low mortality of this condition as managed in recent years, considering its gravity.

These impressions are strengthened by the papers just read. It seems to me that one reason we seldom make correct diagnosis is because few women seek advice before rupture has occurred. They think the early symptoms of little importance, and fail to consult their medical man or surgeon. Aside from lack of opportunity, however, the problem itself is a difficult one, as Dr. Seelye's frank recital of his experience proves. For often when we think it is extrauterine pregnancy, it is not, and vice versa. In the few cases in which I have made correct diagnosis before rupture, I have felt that luck rather than wisdom was the determining factor.

Finally as to mortality: This is lower than in almost any other abdominal emergency and that, whether operation be done at once, delayed for cause, or on occasion withheld altogether.

There is one point concerning these cases which neither speaker brought out, namely, the comparative frequency of a repetition of the condition in the other tube. My operative records show several such cases.

Dr. Michael F. Fallon, Worcester: Extrauterine pregnancy is not always in the tube, and it fell to my lot sometime ago to find an ovarian pregnancy. The pregnancy occupied the ovarian tissue the size of an adult's little finger tip. The specimen was sent to the Harvard Medical School. At the time of operation there was a quantity of blood in the pelvis, and the remarkable thing was that there was a constant dripping of blood from this pregnant area in the ovary.

Dr. J. M. Gile, Hanover: Doubtless most cases of extrauterine pregnancy should be operated on as soon as diagnosis is made. When, however, the patient is severely exsanguinated, the additional shock of immediate operation may, I believe, prove fatal, whereas, with time given to allow them to rally, they may be operated on with safety.

In my own experience, the patient rarely actually bleeds to death from this condition, for, despite any theory concerning it, the blood actually does clot about the seat of rupture, and as the pressure diminishes, this clot becomes firm enough entirely to stop the hemorrhage, and in this condition, with the use of saline stimulation, the patient may more safely be allowed to wait for a period of several, and even many hours, than to be operated on at once. In the cases to which we are called, often many hours after the rupture occurs, I believe the bleeding will either have stopped or the patient will have died before aid arrives.

Dr. Peer Johnson, Beverly. I am inclined to agree with the position Dr. Gile takes, because the only case of extrauterine pregnancy I have lost was one upon whom I operated while in an exsanguinated condition. Personally I feel very strongly that the only thing to do in the extremely exsanguinated cases is to leave them absolutely alone temporarily and give the vessels a chance to close, postponing operation until a more favorable time.

Dr. Homer Gage, Worcester: I should like to get into this discussion to emphasize a single point. Shortly after I had begun the practice of medicine, I remember very well being asked to see the wife of a friend, who was also a friend of Dr. Maurice H. Richardson.

She had had in the night a sudden internal hemorrhage from the rupture of a tubal pregnancy. It was decided to watch and wait. In spite of a condition of extreme shock, which was steadily growing worse, we waited for Dr. Richardson. Four of us stood around and watched that woman die ten hours after the rupture. Today, I should consider such waiting indefensible.

We have now the Kimpton method of immediate transfusion, or, if these tubes are not at hand, we have the method used so successfully at Mt. Sinai Hospital, New York, of drawing the blood into a glass syringe and mixing it with 2% citrate solution, which can be always available.

Immediate operation and immediate transfusion, when the condition of the patient demands it, are the things to do.

Dr. Samuel J. Mixter: I want to get into this too. I have seen patients die from waiting. You cannot tell which one is going to die. That case that Dr. Gage speaks of, I remember very well. You can't tell which way they are going to go. You can do better if you have time for transfusion, if not, get in salt solution; get the tube tied off. Do something and do it quick, and you will save more people than you will kill.

Now there is one thing that has not been said: the septic cases—cases that have been neglected. They get septic abscesses in the pelvis; they die. You should make a hole in the top of the vagina; let the blood and pus, and sometimes even a broken-down fetus, come out. Put in a big enough tube and the patient will get well.

In Chadwick's cases of abdominal pregnancy with death of the fetus, supposed at the time to have been a rupture of the uterus, he removed an unchanged dead baby from the abdominal cavity some years later, the woman being pregnant at the time. I remember this case well, for I had the honor of assisting at the operation.

Dr. W. P. Graves, Boston: It is important in a discussion of this subject to take into consideration the pathological anatomy of tubal pregnancy.

There are in these cases two capsules, the outer one being composed of the thinned-out wall of the tube, while the inner capsule is the surrounding membrane of the fetal tissue. If only the inner capsule ruptures, the blood may ooze out slowly, and eventually clot, forming a tubal hematocele. In such a case there may be a sudden fainting spell, with recovery after the blood begins to clot.

If the outer capsule breaks, the blood pours directly into the peritoneal cavity unchecked. The latter condition is that in which the patient bleeds to death unless there is surgical intervention. It is sometimes impossible to tell from the symptoms of a given case which condition is represented, and it, therefore, seems to me sensible to interfere and stop the hemorrhage as soon as possible. (Demonstration on blackboard.)

Dr. Garry DeN. Hough (closing): As far as the diagnosis of tubal pregnancy is concerned, I use the scheme that I presented here today, and have used it for the last ten years. I think that in a fair majority of cases diagnosis can be made, and that the cases in which diagnosis is really difficult are the neglected cases of people who come to the hospital so long after the original thing has happened that they cannot give you an intelligent history.

I agree with those who believe that cases with rupture should be operated upon at once. It is a case of blood pressure. If the blood pressure is too low, the patient cannot stand it. You can often get a forceps into the abdomen through a small incision in the vaginal vault and stop the bleeding. This will give control of the bleeding long enough for a transfusion to be done, and then one can safely proceed to whatever radical operation is necessary. I am very glad our papers have brought out so much discussion.

Dr. Ralph H. Seelye (closing): This discussion has been very interesting. I cannot agree with the suggestion made by Dr. Hough, that the bleeding point may be reached by a clamp through the vaginal vault. It seems to me that one should go into the abdomen and see what he is doing.

The position I take in regard to operating on exsanguinated cases—I refer to the extreme cases of women who are pulseless, blanched and sweating—is that these women, if operated upon immediately, are in more danger than if you let them wait. They are bled out, and the hemorrhage will in most cases stop spontaneously. Do everything possible, by means of salt solution, blood transfusion and stimulation, to improve this condition. But do not operate until the patient begins to rally from her collapse. It is hard to sit by and not operate, with the patient in a condition of extreme collapse and perhaps still bleeding, but my experience makes me feel very strongly that it is the proper thing to do.

Dr. S. J. Mixter: Put them on the table; first give them salt solution or blood transfusion, then go ahead and operate.

This is the last of the papers, I believe. This has been an interesting meeting and the discussions have been good. It is a good thing to step on someone's toes occasionally and to have your own stepped on. I thank you for your attendance and support. This being the last of the literary part of the program, I, as presiding officer, have finished and I thank you very much. The meeting is adjourned.

Original Articles.

VARIATIONS IN PULMONARY RESONANCE.

BY GEORGE C. SHATTUCK, M.D., BOSTON.

[From the Medical Out-Patient Department of the Massachusetts General Hospital.]

GENERAL OBSERVATIONS.

FOR a number of years I have been studying variations in pulmonary resonance in order to determine their significance in cases in which the question of the existence of tuberculosis of the lungs might arise.

The frequency of slight dulness at the right apex above the clavicle in normal chests is well recognized, and requires no further comment; but when disease exists at the right apex, and when auscultation reveals no sign of it on the left, one would expect the right apex behind to be duller than the left. This is by no means always the case. In fact it was noticed repeatedly in cases in which the diagnosis of early pulmonary tuberculosis of the right apex had been made that slight dulness was found at the *right* apex in front and at the *left* apex behind; also that there were differences of resonance between the bases of the lungs in the back.

To throw light on the significance of these facts, supposedly normal chests were carefully examined, with the result that slight relative dulness at the left apex behind was found not infrequently.

The differences between the apices behind was less marked than that above the clavicles, but was definite enough to be recognized occasionally by students learning to percuss.

With regard to the bases behind, the problem is more complex because, as Dr. Richard C. Cabot has pointed out, stomach resonance can often be elicited in this region. It mixes with the lung resonance and modifies the sound by adding a tympanitic quality to the percussion note. This difference in quality of resonance sometimes makes it difficult to decide which side is the more resonant.

A series of one hundred supposedly normal chests has been studied recently in detail in order to provide more definite data on the occurrence of the variations mentioned above.

Resonance was compared above the clavicles, in the second interspace in front, and at the apices and bases behind. When comparing the apices behind it is important to select the most resonant point which is near the centre of the triangle formed by the upper edge of the trapezius muscle, the lateral muscles of the spine, and the spine of the scapula. Misleading results are likely to be obtained if the points selected for comparison are not symmetrically situated, because the best resonance covers a very limited area.

At the bases there is an area bounded by the spinal muscles, the diaphragm and the roll of the latissimus dorsi which has been called the "triangle of percussion." The best resonance in this region is found where the muscles are thinnest; that is to say, a little below the angle of the scapula and well above the diaphragm.

For the observations which follow, the lightest percussion was used which, in the individual case, would give a clear, resonant note. When heavier percussion is used, slight differences of resonance are more difficult to detect, but do not disappear.

MATERIALS.

Cases were excluded from the series if cardiac or pulmonary symptons were complained of, if the past history gave evidence of phthisis, pleurisy, pneumonia or protracted cough, if careful examination showed anything abnormal, or if there was more than the usual slight asymmetry of the chest. Most of the obese patients were excluded also because such heavy percussion was required to elicit resonance that slight differences were difficult to detect. The series includes women only, nearly all of whom were over 20 years of age and none younger than 16. The cases were taken consecutively as they came to the Out-patient Clinic, without selection except as in above mentioned. The results in detail are shown in the table which follows.

While under examination the patients sat with hands in the lap, the shoulders relaxed as much as possible, and they were asked to bend forward slightly when the bases were being compared.

RESULTS.

Perhaps the most interesting facts brought out are that dulness at the right apex in front frequently extends below the clavicle to the second rib, that slight relative dulness of the left apex behind is common and that the same is true of the left base behind. Relative dulness of the left apex in front was found in only two cases. One of the patients was left-handed but the heart was in the usual position.

Relative dulness was generally, if not always, associated with increase of resistance.

TABLE OF RESULTS IN 100 CASES.

1. No definite difference of resonance at apices or base behind: 22 per cent.
2. Resonance slightly less at *right* apex in front above clavicle only: 27 per cent.
3. Resonance slightly less at right apex in front above clavicle and to second rib: 31 per cent.
4. Resonance slightly less at *left* apex above clavicle: 2 per cent. (one case was left-handed.)
5. Resonance slightly less at *right* apex behind: 7 per cent.
6. Resonance slightly less at *left* apex behind: 34 per cent.

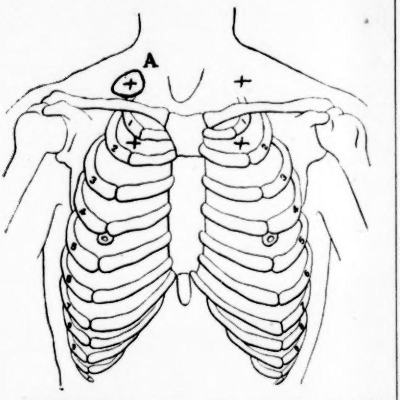

FIG. 1. *a* Resonant area of apex. The crosses show the points at which resonance was compared. Outside of the circumscribed area relative dulness is to be expected.

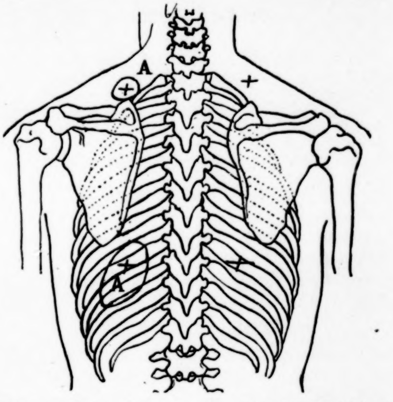

FIG. 2. *a a* Most resonant areas. The crosses show the points at which resonance was compared. Outside of the circumscribed areas relative dulness is to be expected.

7. Resonance slightly less at *right* base behind: 6 per cent.
8. Resonance slightly less at *left* base behind. 28 per cent.

DISCUSSION.

In attempting to explain slight relative dulness of the left apex behind, it may be observed that a little drooping of the right shoulder is extremely common. This was, in fact, observed in a large proportion of the cases even when every effort was made to have the patient sit straight. Drooping of the right shoulder is associated with slight relaxation of the muscles which cover the right apex behind, those on the left being relatively contracted. It is well known that differences in tension of muscles modifies resonance and that resonance is distinctly diminished over contracted muscles. This difference in muscle tension could easily account, I think, for most of the cases in which relative dulness was found at the left apex behind, but in some of the cases in which it occurred no such asymmetry was observed.

For relative dulness at the left base no such simple explanation presents itself. If the reverse were generally true, as it was in six of the cases, this might be explained on the ground that the right diaphragm is higher than the left and rests upon a large, solid organ, namely the liver. But, if this explanation is plausible, is it not at least as likely that the heart, which considerably diminishes the depth of lung on the left side, might diminish lung resonance below the angle of the scapula?

If we accept the view now prevailing that even very light percussion sets the depths of the lungs in vibration, is there anything improbable in the above hypothesis? I think not, and I am convinced that slight cardiac dulness can often be found by light percussion in the axilla, even when the heart is of normal size. (Relation of Dulness to Cardiac Outlines, BOSTON MEDICAL AND SURGICAL JOURNAL, Vol. clxxiv, p. 301, 1916.) It would not seem surprising, therefore, if traces of it should appear in the back. The shape of the chest might determine its presence or absence there.

X-rays of the chest were taken in 6 of the patients. These showed slight abnormalities such as are found in 90-95 per cent. of all chests; but it seems improbable that these abnormalities bore an important relation to the findings above described.

CONCLUSIONS.

Slight differences in pulmonary resonance below the clavicles in front, and at the apices and bases behind, are common in chests which can properly be regarded as negative from a clinical standpoint. These differences are ordinarily disregarded. They are important when, for other reasons, the existence of pulmonary disease is suspected. Under these conditions they may lead the examiner to believe the disease is more extensive than it is, or they may be a factor in causing him to make a diagnosis of phthisis when it does not in fact exist.

I think that I have seen many cases in which the diagnosis of phthisis has been made on insufficient evidence, with resulting hardship to the patient, and that the variations of resonance above mentioned may have led to errors in this direction. On the other hand, it should be emphasized that the variations of resonance discussed here are slight, and that the importance of well-marked dulness for diagnosis is not in question.

To the skeptical it may be said that the variations above described have been confirmed by other physicians to whose attention they were called, and that even students learning percussion can sometimes recognize them.

VARIATIONS IN PULMONARY VOICE SOUNDS.

By William Duncan Reid, M.D., Newton, Mass.

[From the Medical Out-Patient Department, of the Massachusetts General Hospital.]

The object of the work to be described was to gain detailed information as to the variations which are to be found in chests which might be classed as normal. For this study a chest was considered "normal" if the percussion and breath sounds showed no abnormal findings, if the chest was reasonably symmetrical, and the present and past history was negative as to pneumonia, pleurisy, chronic cough, etc. Cardiac cases were also excluded, due to the possibility that passive congestion might be a factor in some of the findings. One hundred cases were examined,—98 women and 2 men. Three patients were submitted to x-ray examinations for confirmation of the term "normal," and failed to show cause for the variations in physical signs. A somewhat larger number of similarly selected cases were sent for x-ray examination by Dr. George C. Shattuck with similar negative results, and thus it was not thought profitable to submit more cases in this series.

The method used was that of recording the areas in which the spoken or whispered voice sounds, or both, of one side of the chest were louder than on the corresponding area of the other side. That is, it was a comparison method. The work was facilitated by the use of individual cards stamped with the well-known diagrams of the front and back of the chest, and on these the findings were recorded. A careful record was kept of the age, weight and diagnosis in each case.

It was found that the spoken voice was audible over the whole chest, whereas the whispered voice often was appreciable only above the clavicles and spine of the scapula. As was expected, the spoken voice was transmitted with greatest intensity over the primary bronchi and apices. At the apex in some cases the relative loudness of the spoken voice could not be safely judged because of the too great volume of sound. In the earlier part of the work we noted that care in listening nearer the outer border of the apices made it easier to appreciate a difference, if present. In other words, at the inner margin of the apex in front, the voice sounds tended to be transmitted, probably from the trachea, in about equal intensity. A study of the collected findings, using the comparison method, is shown in the following table.

Statistics in 100 Cases.

	No. of Cases or Per Cent.	Average Age	Average Weight.
Apices			
Front			
Rt. > Lt.	88	32	136
W. and S. V.	66	33	138
W. V. only	10	32	132
S. V. only	12	32	134
Apices alike	12	35	138
Back			
Rt. > Lt.	100	34	137
W. V. to spine of scapula	94	33	136
W. V. to top only	6	43	159
S. V. to midscapula	100	34	137
Fronts below Clavicles			
Rt. > Lt.	100	34	137
S. V. throughout	100	34	137
W. V. to 1st rib	76	34	140
W. V. to 2nd rib or below	24	31	129
Bases			
Rt. > Lt.	15		
S. V. only	15	32	134
Lt. > Rt.	44		
S. V. only	44	37	144
W. and S. V.	4	27	116
Bases alike	41	30	131

Examination of the findings disclose no striking differences in the average age or weight of the different groups. The difference in the extent of transmission of the whispered voice below the clavicles may well have been due to the quality of the voice, and also we note a greater average weight in those in which the whispered voice was not audible below the first rib.

In 100% of the cases the spoken or whispered voice, or both, were heard louder than on the opposite side, over the right front below the clavicle and at the right apex behind.

In the backs a noteworthy feature was the frequency with which the spoken voice was heard louder at the left base. This was noted to be generally more definite over the area just internal to the inferior angle of the scapula, which area is sometimes called the triangle of auscultation. The proximity of the stomach and its probable influence as a resonator has been suggested by Dr. Richard Cabot. The whispered voice was rarely transmitted to either base; perhaps the female voice was a factor in this.

Some 47 of the patients in this series were also examined by Dr. George C. Shattuck, who was studying the variations in pulmonary resonance. Neither of us knew in a given case what the other had found. For the purpose of comparison between these cases, tested for both resonance and the voice sounds, we will adhere to Dr. Shattuck's grouping,* and then list the number of cases and the findings as regards the voice sounds.

1. No definite difference of resonance at apices or base behind: 13 cases. Apices, Rt.>Lt., 13. Bases, Lt.>Rt., 8; Rt>Lt., 2; bases alike, 3.

2. Resonance slightly less at right apex in front above clavicle only: 13 cases. Rt.>Lt., 10. Apices alike, 3.

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* See Journal, p. 599, "Variations in Pulmonary Resonance."

3. Resonance slightly less at right apex in front above clavicle and to second rib: 8 cases. Voice sounds>here, 8.
4. Resonance slightly less at left apex above clavicle: No cases in the group compared.
5. Resonance slightly less at right apex behind: 2 cases. Voice sounds>here, 2.
6. Resonance slightly less at left apex behind: 9 cases. Rt.>Lt., 9.
7. Resonance slightly less at right base behind: 3 cases. Lt. base>Rt., 2. Bases alike, 1.
8. Resonance slightly less at left base behind: 10 cases. Bases alike, 5; Lt. base>Rt., 3; Rt. base>Lt., 2.

The above results appear to show that the variations in voice sounds follow those in percussion with a fair degree of accuracy only over the right apex (Groups 2, 3 and 5), whereas in most they were variable, and in one (Group 9) even reversed.

CONCLUSIONS.

This study of the variations in pulmonary voice sounds and comparison with the variations in pulmonary resonance suggests the following:

The spoken and whispered voice, though most often louder at the right apex, are not necessarily so in chests that are clinically negative.

The left base may transmit the spoken voice louder in a surprising number of cases.

The variations in pulmonary voice sounds do not follow with any degree of accuracy those in pulmonary resonance, save over the right apex.

The transmission of the spoken and whispered voice over normal chests presents considerable variation, and this should be clearly appreciated in drawing conclusions as to the presence of pathological conditions, such as pulmonary tuberculosis, etc.

Medical Progress.

RECENT PROGRESS IN PHYSIOLOGY.

By P. G. Stiles, PhD., Cambridge, Mass.,

Assistant Professor of Physiology, Harvard University.

We cannot expect in these days that our conceptions in physiology are to be changed in revolutionary fashion as the result of single researches or within any short space of time. The mass of knowedge made secure by the labors of a century is large in comparison with the addition of a year, even though the number of the workers is greater than ever before. A profitable review of recent progress will take less account of specific contributions than of gradual changes in emphasis and interpretation traceable to many sources. This fact may be illustrated in connection with present views of muscle contraction.

THE PRODUCTION OF MOVEMENT IN SKELETAL MUSCLE.

We have been accustomed to picture the contracting muscle as resembling closely a steam-engine. We know that in both the consumption of fuel results in motion. We know that in both there is liberation of heat, most of which is wasted so far as the accomplishment of work is concerned. It has been natural to believe that in the muscle, as in the locomotive, the heat is primary, and the movement the expression of the transformation into work of a fraction of this heat. Earlier theories of muscle contraction have been based upon this conviction; the attempt has been to account for the shortening of the muscle as the result of a previous evolution of heat within it.

We are now asked to consider the merits of a very different doctrine. The heat production is assumed not to precede the execution of the movement, but in a great degree to follow it. This unexpected temporal relation seems to be fully demonstrated through the skilful work of A. V. Hill[1] of Cambridge, England. He has employed thermo-electric apparatus of remarkable delicacy. The direct cause of the contraction is held to be the generation in the active elements of a form of lactic acid. This compound has long been recognized as one of several possible "fatigue substances."

Why do the finest contractile units—the fibrils—shorten when they are acidified? Probably because this change in reaction leads to the imbibition of water. Any attenuated structure receiving water into itself will shorten and thicken on the principle that it tends toward a spherical form as a geometric limit. The fibrils of muscle are supposed to be beset with nodes at frequent intervals, and if we assume that thickening at these nodes is not permitted, then it is the short cylindrical internodes of the fibrils which tend to become spherical at the moment of acidification.

Whence comes the lactic acid? It has been natural to suppose that it is formed when sugar is being destroyed. We are sure that sugar is the preferred fuel to be oxidized in support of muscular activity. The chemical relationship between sugar and lactic acid is a close one. But we are told that the acid must be derived from something different from sugar, an undetermined "precursor." The reasoning which led Hill to this conclusion is mathematical. The potential energy of lactic acid is too nearly equal to that of sugar to permit us to attribute the power displayed by a contracting muscle to the transformation of the latter into the former. A more energetic explosive is required.

As the conditions are now pictured, the arrival of the nerve-impulse causes the decomposition of the lactic acid precursor. Under the influence of the acid the fibrils take water to themselves and shorten. We have next to consider what happens during the relaxation. If the muscle is to return to its original length, the water which has entered the fibrils must be released. If it has been attracted into them because of localized acidity its release implies the disappearance of the acid. The process of relaxation is, therefore, conditioned by the removal of this compound. It might conceivably be neutralized or oxidized. The normal event seems to be different from either of these, and far more economical.

The acid is incorporated once more in the precursor which just now gave rise to it. An evolution of energy attended its formation, and the reverse reaction cannot be carried through unless a corresponding quantity of energy is supplied. The reconstruction of the precursor is an example of what the chemist calls an endothermic process. In this respect it is like the manufacture of starch in the leaves of green plants,—a synthesis which requires the driving power of radiant energy. In the muscle the renewal of the lactic acid precursor is made possible by applying energy derived from the combustion of sugar or some substitute.

It has been said that the chief heat production follows the act of contraction, instead of preceding it. In other words, it attends relaxation, and is the sign of oxidation devoted to reconstructing the standard ammunition of the muscle. In this service the sugar, or other food, is oxidized cleanly to carbon dioxide and water. The possibility that lactic acid may be formed as a result of a failure to complete this reaction is no longer emphasized if, indeed, it is not definitely denied.

At first thought it seems as though the new view of the muscular process were wholly without analogy, and far less acceptable than the old. We shall find, however, that it is easy to suggest parallel cases in the field of mechanics. One of the best for our purpose is the pile-driver. Suppose, at the outset, that the weight is hanging at the top of the guides. It may be let fall, dealing a blow to the pile. The puffing of the engine follows this blow and results in the storage of potential energy measured by the height to which the weight is raised. The next blow may be indefinitely postponed. Work may be discontinued for the night, and there will be latent in the contrivance the capacity to give one stroke next morning, even though the fire under the boiler is allowed to go out. So we have latent in a muscle the capacity to perform, not one, but many acts of contraction before it is necessary to consume more fuel.

Again, a muscle is like the air-brake, which is ready for instant service because of potential energy accumulated at some previous time. Or it is like a storage battery which has been charged in the past when coal was burned to provide it with a store of energy. The merit of both the air-brake and the battery lies in their instant readiness for action and their independence of present fuel consumption. The muscle apparently has the same important quality. Of course, when a series of contractions is being executed the combustion and replenishing of the energy store fairly keeps pace with the detonations. But it is still fundamentally true that the oxidation is following, and not initiating, the individual acts.

The new presentation of the case is readily harmonized with the facts of fatigue. We have been accustomed to attribute fatigue to exhaustion of fuel and gathering of wastes. We have now to recognize that there will be complete recovery from fatigue whenever the lactic acid is perfectly removed and the stock of unstable precursor fully restored. Under ideal conditions the one implies the other. Fuel must be oxidized to secure the desired result. Failure of fuel will leave the muscle poisoned by lactic acid. The removal of the acid through the circulation is possible, but in this case the lack of precursor will sooner or later set a limit to activity.

One of the peculiarities displayed by frog's muscle when fatigued is a delayed relaxation. This is well explained on the terms of our theory. If contraction is due to the development of an acid reaction, relaxation cannot occur until the acid is removed. This will naturally be accomplished less surely and promptly as fatigue progresses. The question may be asked, however, why a severely fatigued muscle relaxes at all. To answer this it may be suggested that, while acidified fibrils will remain contracted so long as the surrounding material—sarcoplasm—is of a lower degree of acidity, a uniform concentration of the acid throughout the whole fabric will tend to the same distribution of water as though the reaction were neutral, that is, the state will be one of relaxation. Contracture will, then, be the sign of persistent acidity in the fibrils, while an entire failure of contraction will ensue when the general acidity is such that they can no longer exceed it at moments of stimulation.

When we consider the condition of contracture as we have just pictured it, the problems of tonus are brought to mind. We are reminded that a muscle may remain shortened without doing work or producing heat; in fact, heat has to be generated to allow it to extend. All that is needed to keep a muscle in contraction is a suspension of its life-processes. What is called tone may evidently be either of two utterly unlike conditions: it may result from an arrest of the metabolic activity or it may be a mild sort of tetanus due to rapidly recurring and blended contractions. Tone in the first sense will not necessarily be exhausting, and it will be unrelated to the production of animal heat. Conjectures regarding the nature of cataleptic rigidity naturally arise.

It is well established that the tonus of smooth muscle is an economical phenomenon in which a certain length of fiber is probably assumed and maintained as we have indicated—not so much by chemical processes, continuing over the whole period as by the suspension of such processes when they have advanced to a certain stage. The muscles of molluscs have been found to give an extraordinary illustration of such a fixation. It is reported that when the shells of the scallop are forced apart and braced by inserting a block of wood, this object may presently be pulled out, when the shells will remain as motionless as the jaws of a vise. They seemed to be attempting to close, when in reality they were merely locked in a particular position.

The All or None Principle. Several years ago Keith Lucas of Cambridge furnished strong evidence for the view that the grading of muscle contractions from the least to the greatest is a matter of the proportion of the fibers employed. He was led to the belief that the individual fiber contracts to the fullest extent or not at all when stimulated. A small contraction would, therefore, be one resulting from the coöperation of a limited number of the contractile units. A true maximal response would indicate that all the fibers had been excited. It is doubtful whether the majority of physiologists have been greatly impressed by this conception. It has, nevertheless, had strong support, and recently it has been supplemented by a thesis even more radical. This is to the effect that nerve-impulses within single nerve-fibers are invariable in intensity. The doctrine is defended most ably by Adrian.[2]

It is impossible to give a clear account of his methods and reasoning in a very condensed form. Still, the main argument may be given. We know that conduction along a nerve-trunk may be blocked by the application of anesthetics. The same effect may be produced by cooling. The anesthesia or chilling may be restricted to any desired length of nerve. Adrian has compared the result secured by making such applications to regions of varying extent in the sciatic nerve of the frog, sometimes making use of more than one zone in the same nerve. Suppose one nerve (A) is narcotized for a space of 20 millimeters, while in a second nerve (B) there are two regions, each 10 millimeters long, separated by an interval in which the anesthetic is not applied. If an impulse is to pass through the whole length of either nerve it has to traverse 20 millimeters in which it meets with resistance.

Now it is found that a given length of narcotized nerve may extinguish a nerve-impulse which could successfully penetrate two narcotized segments of half this length. There is only one easy explanation for this fact: that a nerve-impulse emerging from a region in which it has suffered weakening immediately regains a certain intensity. If it did not, but continued with reduced strength, it would suffer extinction in the second short zone of lowered conductivity. Consideration will show that to admit this is to arrive at the conclusion that the intensity of a nerve-impulse is not determined by the strength of the stimulus producing it.

Perhaps this may be made clearer. Let attention be fixed on the segment of normal nerve between two regions of narcosis. We may think of this particular part of the nerve as being stimulated by the disturbance which enters it from the first zone of anesthesia. We know that this disturbance has been reduced below its original energy by at least 50%. (That is, it could not reach the end of another segment of high resistance of a length equal to that through which it has already come.) Yet the impulse actually set up by this subnormal disturbance is able to penetrate such a segment when it has first run along a few millimeters of unimpaired nerve. That is to say that a submaximal stimulus has developed a maximal impulse. The nerve has shown the "all or none" character long familiar in the heart, and lately ascribed to the fibre of skeletal muscle.

A simpler type of evidence has been furnished. Adrian has shown that if the narcotization of a given length of nerve just suffices to extinguish impulses originated by weak electrical stimuli it is not necessary to apply the anesthetic to any greater length of nerve to stop the passage of impulses started by the most powerful shocks. The inference is that with an adequate stimulus an impulse is sent along the nerve, which could not be endowed with any greater intensity by increasing the stimulus. This, once more, is the "all or none" principle.

If the process in a nerve cannot vary with the intensity of the stimulus causing it, how can we explain the graded effects often observed both on the sensory and the motor side in the actual performances of the mechanism? There seem to be two resorts available. In the first place, gradations may be secured by variations of the number of fibers employed. This is the same conception we must probably hold in regard to the performances of skeletal muscles, which can exert slight or powerful tensions, as may be required at different times. But there are difficulties apparent in the sensory realm. It does not seem likely that we judge one star to be brighter than another because it is able to bring into action a larger number of fibers in the optic nerve. Yet this may be true, and it is precisely what the dispersion phenomena of the retina would favor.

A second way in which we may reconcile the "all or none" principle with gradations of nervous effects is by emphasizing the possible variations in the frequency at which impulses may follow one another along the fibers. To increase the number of nerve-impulses passing in a second may have results much resembling those which would follow actual increase in intensity without quickening of rhythm. Recent work has impressed upon us the high frequencies at which conduction may go on. Reference may be made to the observations of Forbes and Rappleye.[3]

Sensitive galvanometers placed in connection with either muscles or nerves give indications of rapid oscillations of electrical potential during activity. These indications may be made graphic and permanent by photographic methods. They give us the means for estimating the rhythm of life-processes in both these tissues. When a human muscle is voluntarily contracted and the electrical signs of the action are registered by the galvanometer it is usual to find that the apparently continuous contraction is compounded of individual acts which are repeated about 50 times in a second. It has been urged that this demonstrates that the impulses causing the contraction are sent from the motor centers in the cord with just this frequency.

Forbes and Rappleye have shown that this correspondence between processes in muscle and in nerve should not be assumed. They have studied the electrical manifestations of voluntary contraction in a muscle of the hand under ordinary conditions, and again when the hand has been severely chilled. The cooling is found to lower the frequency of the electrical oscillations from the usual 50 per second to 40 or less. Now the cooling of the hand can have no appreciable effect upon the temperature of the spinal cord. It becomes probable that the impulses are sent with the same frequency to the cold and to the warm muscle. The number per second can in no case be less than the number of the muscular responses, and it may be very much greater.

The strict limit which is set to the number of impulses which can pass along a nerve in one second is determined by the refractory period. After a stimulus has taken effect upon a nerve there is an exceedingly brief interval within which no stimulus can be made effective. The duration of this period is only about 0.0002 of a second. It would theoretically be possible to generate impulses at a rate of 5000 in a second. But this would call for the strongest stimulation, since the period of absolute refusal to respond is followed by a longer interval of relatively low irritability. In view of many facts, Forbes and Rappleye incline to think that the normal frequency of impulses passing along human nerves is not less than 300 per second.

If this is correct, why does the muscle give evidence of a rhythm so much lower? This may be explained by taking into account the refractory period of muscle which is longer than that of nerve. When the contractile mechanism has answered once to stimulation it will be so long in recovering the capacity for action that several nerve-impulses may arrive without result. It will respond again when its threshold has fallen to such a level that a particular impulse can break over.

Hunger. An interesting monograph on this subject is that of Carlson.[4] He has profited by having under observation for some years an intelligent man who has a large gastric fistula. The opening was made to preserve life after an accidental closure of the esophagus which occurred in early youth. It readily admits the introduction of balloons and other apparatus into the stomach. Carlson has confirmed the previous observation of Washburn and Cannon that the sensation of hunger is the accompaniment and presumably the result of intense gastric contraction.

Other human subjects, as well as animals, have been utilized in this series of studies. It has been shown for the dog that young animals have more active hunger contractions than adults. Diabetes induced by removal of the pancreas is found to be characterized by uncommonly severe objective as well as subjective signs of hunger. Fasting does not greatly lessen the motor reactions of the stomach, though the pangs that attend them are blunted after a day or two.

There are many incidental findings. Carlson reports that the temperature sense of the gastric mucosa is fairly accurate. The output of human gastric juice for 24 hours is estimated at 1500 cc. (It is convenient to recall that this is the same as the figure usually given for the urine, and that it has also been made to stand for the daily salivary secretion.) The acidity of the juice in Carlson's subject has been regularly found as high as 0.5% HCl. The suggestion is made that hyperacidity in the experience of the practitioner comes, not from an over-concentrated, but from an over-abundant juice.

The Field of Nutrition. Five years ago the emphasis in this sphere was upon the variable value of proteins from different sources. It appears largely to have shifted to the importance of minor constituents of the diet. The view that beri-beri, scurvy, and perhaps pellagra are deficiency diseases, in the sense that they are caused by the failure of the food to provide certain specific compounds which are required for normal maintenance, is generally familiar. It was at first proposed to describe these essential substances as vitamines. The term would imply that they were nitrogenous and of a fixed molecular type. It has been thought better to call them merely accessory substances. This does not commit one to any narrow conception of their chemical nature.

The possibility that the nutritive worth of foods may suffer by the high temperature applied in cooking has often been considered. The valuable accessories may in some cases be decomposed, or at least denatured, by heat. Recognizing this, it is interesting to record an observation of Mendel,[5] that cotton-seed and its products are actually made more suitable for the nutrition of animals when they have been strongly heated. In this instance an injurious property present in the raw food is nullified. We are shown that a sweeping condemnation of cookery, based on the assumption that it always reduces food values, would be quite premature.

Cell Structure. A most suggestive line of experimentation has lately been pursued by Clowes.[6] It has resulted in giving us a clearer picture of the differences existing between cell surfaces and cell interiors than has been afforded hitherto. The studies have been of emulsion formation and surface tension variations as influenced by electrolytes. No adequate presentation can be included in a summary like the present, but we may indicate the outstanding conclusion of the author regarding the organization of cells.

Two chief classes of constituents have to be distinguished,—those which are soluble in water, and those of a lipoid nature which are not thus soluble. It has long been believed that the lipoids of cells are concentrated on the surface. According to Clowes, the fatty material at the surface is continuous, but encloses droplets of water with characteristic solutes. Below the surface of the cells we pass to a region in which the aqueous solution is continuous but holds droplets of fatty material. Crude as the comparison may be, the situation reduces itself to this: the superficial part of a cell is a kind of butter, while the interior is a cream. The existence of these two contrasted phases is apparently conditioned by the distribution of electrolytes in the cell, and a new light is thrown upon the antagonism long known to exist between certain of these, notably Na and Ca. Where the Na effect is dominant the protoplasm tends to organize in the "cream" phase; Ca favors the formation of a "butter."

The doctrines of Clowes are certain to prove fundamental in theories of absorption, secretion, ameboid movement, anesthesia, and many other matters.

The researches which have been reviewed may have seemed rather academic, but the clinical interest and importance of such investigation cannot always be foreseen. Meanwhile there have been some studies which are fully as significant for the clinician as for the physiologist. This is notably true of the observations of Allen[7] upon the pancreas. These have been brought to the attention of all who are especially interested in the treatment of diabetes by Joslin's admirable book. The experimental procedure may not be so familiar to the general practitioner as to make a brief account superfluous.

The fact that diabetes mellitus is ordinarily the result of a pancreatic defect has been well established for many years. A function of this organ even more necessary than its digestive contribution is the delivery to the blood of the hormone which makes it possible for the muscles, including the heart, to oxidize sugar. Abundance of this hormone insures a high tolerance for sugar; want of it produces, according to the degree of the lack, a low tolerance or substantial inability to make use of carbohydrate.

Allen lowered the sugar tolerance in dogs by partial removal of the pancreas. The injury may be remarkably extensive before a critical condition is reached. The subsequent career of a dog so dealt with was found to depend on the diet. If carbohydrate is supplied cautiously all may be well. If sugar feeding is forced, there occurs not only glycosuria—the elimination of the larger part of the carbohydrate—but a progressive reduction of the tolerance, much as though more pancreatic tissue were undergoing destruction. This loss of tolerance may proceed to the development of intense diabetes, with acidosis and a fatal issue.

These experiments have been influential in determining the Allen treatment for diabetes. Assuming that the pancreas of the patient is like that of the injured dog, the physician seeks to spare it by the fasting system, and then a diet so regulated as to obviate a return of glycosuria. Seldom has an improvement in practice come so directly from studies on animals. It appears that sugar tolerance can never be built up by forcing the feeding; so far as it increases at all, it is when the demands on the pancreas are lightened. There is a divergence between this case and the standard principle of developing immunity by insult.

Internal Secretions. There is probably no division of physiology in which the last few years have brought so extensive developments as this. There is no field in which the immediate future promises more important additions to our knowledge. Even a casual reading of Shaefer's[8] recent summary will confirm both these statements. It may be added that the difficulties to be overcome are far more evident than formerly. This is owing to the discovery of reciprocal relations existing between the tissues which serve the organism by dispensing active substances.

It is now seen that any one of these tissues may reinforce, oppose, or otherwise modify the influence of any other. The number of possibilities increases according to the mathematical principle of permutations. At the same time we are obliged to recognize that organs once regarded as homogeneous are compounded of tissues having unlike properties. The thyroid resolves itself into thyroid proper and parathyroids. The adrenal has a cortex differing in function from its medulla. The pituitary is a two-fold or three-fold structure. Furthermore, the fact of nervous control, which is ever more distinct as observations are multiplied, introduces new factors hard to evaluate. But we may not doubt that the difficulty will prove a challenge, and that we shall steadily learn more of the "chemical integration," which is so fundamental to the organism.

REFERENCES.

[1] Hill's work is reviewed in Bayliss' "General Principles of Physiology," Longmans, 1916, p. 441.
[2] Adrian: Journal of Physiology, 1913, Vol. xlvi, p. 412.
[3] Forbes and Rappleye: Am. Jour. of Phys., 1917, Vol. xlii, pp. 228-255.
[4] Carlson: The Control of Hunger in Health and Diseases, Chicago University Press, 1916.
[5] Mendel: Reported to the American Physiological Society, New York, 1916.
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[7] Joslin: The Treatment of Diabetes Mellitus, Lea & Febiger, 1916.
[8] Shaefer: The Endocrine Organs, Longmans, 1916.

Harvard Medical School.

SYLLABUS OF LECTURES ON MILITARY MEDICINE.

By Lt. Col. Weston P. Chamberlain,

Medical Corps, U. S. Army.

Dates of Delivery to Harvard Graduate School of Medicine, Spring Session, 1917, 4.30 p.m., Building B.

Tuesday, March 27	Lecture II
Thursday, March 29	Lecture IV
Tuesday, April 3	Lecture V
Thursday, April 5	Lecture VI
Tuesday, April 10	Lecture VII
Thursday, April 12	Lecture VIII
Tuesday, April 17	Lecture IX
Thursday, April 19	Lecture X
Tuesday, April 24	Lecture XI
Thursday, April 26	Lecture XII
Tuesday, May 1	Lecture XIII
Thursday, May 3,	Moving pictures and lantern slides.
Tuesday, May 8	Lecture XIV
Thursday, May 10	Lecture XV
Tuesday, May 15	Lecture III
Thursday, May 17	Lecture I
Tuesday, May 22	Lecture XVI

Lecture I.*

History of Military Medicine and Its Contributions to Science.

Antiquity of Military Medicine.
Primary purpose of military surgeon is not humanitarian.
Military surgery in Greek and Roman times.
Military medicine in Middle Ages.
Surgical procedures in ancient and medieval times.
Changes caused by introduction of firearms.
Barber-surgeons and low esteem in which they were held.
Growth of sanitary service and mobile hospitals.
Increasing recognition of military surgeons and demand for rank and authority.
Changes in tactics prior to Civil War and inadequacy of sanitary service in meeting greater demands on it.
Letterman and the development of mobile ambulance companies and hospitals.
Improvement in military surgery.
Birth of preventive medicine.
Military surgeons who have left a mark: Paré, Hunter, Larrey, Pirogoff, Laveran, Ross, Craig, Ashburn, Leishman, Donovan, Ashford, Vedder, Sternberg, Wood, Ainsworth, Billings, Letterman, Laennec, Beaumont, Reed, Carroll.

Lecture II.

The Medical Department of the United States Army. Duties Devolving upon the Medical Department in Peace and War.

Constituent Corps of Medical Department.
Medical Corps; appointment and promotion in Corps. (M. M. D. 1-130, and Bulletin 16, War Dept., 1916.)
Medical Reserve Corps; active and inactive list.
Volunteer Surgeons.
Contract Surgeons.
Dental Corps.
Enlisted men, Medical Department; duties, instruction and promotion. (See Drill Regulations and Service Manual Sanitary Troops and Mason's Handbook for Sanitary Troops.)
Female Nurse Corps, Civilian Employees.
General duties of Medical Department in peace. (A. R. 1386 and 1387.)
Sanitation and health of army. (M. M. D. 182-350.)
Care of sick and wounded. Need of wide knowledge on part of medical officers. (Moss.)
Physical examinations. (See index M. M. D. under "Physical examinations.")
Management of military hospitals, post and general. (M. M. D. 204-344.)
Sick call. (M. M. D., 206-209.)
Reports and records. (M. M. D. 398, 399, 558, and 960-965.)
Instruction in Medical Department. (M. M. D. 131-181.)
Medical Supply Depots. (M. M. D. 380. Also see M. M. D. index under "Medical Supply Depots.")
Duties of Medical Department in War. (F. S. R. 329-353.)
Sanitation.
Treatment of sick and wounded.
Furnishing supplies.
Records.
Equipment of Medical Officers and enlisted men of the Medical Department. (M. M. D. 864, 865 and 907.)

Lecture III.

Records Required of the Medical Department. Supplies for the Medical Department, Methods for Obtaining and Accounting for Same. Samples of Medical Equipment.

Necessity for knowledge regarding records and reports. (M. M. D. 398, 558, and 960-965; A.R. 1386-1492.)
Muster and Pay Rolls. (A. R. pars. 807-810.)
Descriptive lists. (See index A. R.)
Hospital fund and sources of same. (M. M. D. 248-262.)
Hospital laundry. (M. M. D. 265-278.)
Comparison of detachment of enlisted men of Medical Dept. and company of Infantry. A. R. 265-302.)
Morning report of sick and wounded. (M. M. D. 204-208.)
Clinical records. (M. M. D. 407-411.)
Syphilitic and malarial registers. (M. M. D. 200 and 195-197.)

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* Published in full in the issue of the Journal for April 5, 1917.

Register cards and report of sick and wounded. (M. M. D. 427-473 and 567-584.)
Details of preparing cards. (M. M. D. 220.)
Discharge for disability. (A. R. 159-161.)
Sick leaves and sick furloughs. (A. R. 57.)
Sanitary Reports. (M. M. D. 182 and 414-417.)
Property accountability and responsibility. (M. M. D. 474-527 and 842-959; A. R. 203 and 657. See index A. R. under "Public Property.")
Expendible and non-expendible property. (M. M. D. note on page 245.)
Three classes required by the Medical Department, viz., quartermasters, ordnance and medical property. (M. M. D. 862 and 864-901.)
Invoices, receipts and returns. (M. M. D. 496-510 and A. R. 693-703.)
Surveys and inspections. (A. R. 710-726 and 678.)
Property issued to enlisted men for individual use. (M. M. D. 47-49.)
Principal articles in each of the three classes of property. Equipment A, B and C. (M M. D. 860.)
Necessity for Medical Officers to have a knowledge of property and the methods of obtaining and accounting for same.

(In addition to the references above given, the details for preparing these blanks are printed on the back of each form. For quartermaster and ordnance property and its handling, consult the Q. M. and Ordnance Manuals.)

LECTURE IV.

Examination of Recruits.

Fundamental importance of subject.
Present methods of recruiting and preliminary requirements.
Degree of physical development with maximum and minimum limits. (Circular No. 2, War Dept., Nov. 1, 1916.)
Order of procedure of physical examination.
Notation of defects in those accepted.
Importance of mental and moral standards.
Visual and aural requirements.
Teeth, circulation and feet.
Physical requirements in foreign armies.
Effects of class, age and race on soldiers.
Proportion of rejections and causes therefor.
Cadets for Military Academy.
Purposes of recruit depots.
Identification records. (Finger prints.) (M. M. D. pars. 392-395.)
Expense to government of an undesirable recruit.
Pension claims.
Possibility for interesting observations while recruiting.

(Causes for rejection and method of examination are given in General Order 66, War Dept., April 18, 1910. The subject is fully discussed in the standard works on military hygiene by Munson, Ashburn, Havard and Woodhull.)

LECTURE V.

Military Hygiene in General.

Includes both personal and public hygiene.
Selection of sites for military posts.
Water supplies, quantity needed and method of purifying.
Sewerage systems.
Construction of barracks.
Requirements in the dormitory rooms; necessary cubic air space, heating and lighting; lavatories and kitchens.
Military hospitals and guard houses.
Care of corrals.
The clothing of the soldier. Influence of material and color.
Head gear and foot wear. Essentials of a good military shoe. (Military Shoe.) Leggins.
Equipment of the soldier; its weight; requirements of ideal pack; present U. S. Army pack.
The army ration; components; amounts of fat, proteid and carbohydrates and fuel value; bearing on military efficiency; care needed in purchase and preparations.

(All of these subjects are fully covered by the appropriate chapters in the standard text-books on military hygiene by Munson, Havard, Woodhull and Ashburn.) At this lecture samples of military equipment will be shown.

LECTURE VI.

Personal Hygiene. Hygiene of Hot and Cold Countries and Hygiene of Troop Ships and Troop Trains.

Personal cleanliness.
Care of mouth.
Avoidance of common articles.
Dietary precautions.
Care of feet.
Avoidance of alcohol.
Venereal peril.
Characteristics of tropical climates.
Duration of tropical tours.
Deleterious influences active in tropics.
Special personal precautions needed.
Avoidance of contact with natives.
Bathing.
Protection from sun.
Clothing.
Requirements in buildings.
Protection from mosquitoes.
Tropical tentage.
Dietary requirements in the tropics. Foods.
Effects of very cold climates.
Trench foot. (Treatment of Injuries, page 112.)
Precaution necessary.
Sanitation of troop ships.
Ventilation of ships.
Transport hospitals.
Sanitation of troop trains.

(All these subjects are fully covered by the appropriate chapters in the standard text-books on military sanitation by Munson, Havard, Woodhull and Ashburn.)

LECTURE VII.

Marching, Care of Marching Troops and Camp Sanitation.

Need of preliminary training before campaign.
Nature of the military step.
Flexion marching.
Rate of march and distance covered.
Work performed in marching.
Factors affecting length of march: size of command, character of roads, weather, manner of conducting marches.
Drinking on march.
Foot troubles.
Selection of camp sites.
Importance of avoiding crowding.

Water supplies in campaign, and methods of purifying water.

Hypochlorite method best. (Mil. Surg., March, 1915, page 205.) Quantity of water required.

Shelter of troops. Varieties of tentage. Sanitary care of tents.

Winter quarters.

Disposal of excreta. Latrine boxes and care of latrines. Urinals.

Garbage disposal by incineration.

Care of picket lines.

Protection from flies and mosquitoes.

Cooking and care of food.

Bathing.

Prompt diagnosis and isolation of infectious diseases.

Sanitary orders and need of coöperation on the part of all concerned.

(These subjects are treated fully in the appropriate chapters of the standard text-books on military hygiene by Munson, Havard, Woodhull and Ashburn.)

Lecture VIII.

The Diseases Prevailing among Soldiers and Their Prevention. Important Bearing of These on the Outcome of Campaigns.

General consideration.

Occurrence in fresh levies.

Classification of causes.

Typhoid fever and its seriousness in the past. Method of dissemination in camp by flies, contact and dust. General method of sanitary control. Specific methods of control by antityphoid vaccination. Typhoid vaccination does not favor tuberculosis. Tetra-vaccine. (Mil. Surg., Oct., 1916, page 361; Mil. Surg., Feb., 1916, page 214.)

Diarrheal diseases and dysentery.

Asiatic cholera.

Insect-borne diseases.

Great importance of malaria in campaigns. Life history of mosquitoes. Three steps necessary to suppress malaria. Yellow fever. Typhus or camp fever. Methods of destroying lice.

Importance of measles in armies.

Smallpox.

Miscellaneous infectious diseases.

Alcoholism and its results.

Venereal disease as a factor in peace and war. Prophylaxis of venereal diseases.

Scurvy.

Beriberi and its prevention.

"Irritable heart of the soldier."

Pied forcé.

Insanity in war.

Influences of camp diseases on history—ancient and modern.

(All these subjects are fully covered in the standard text-books on military hygiene by Munson, Havard, Woodhull and Ashburn and by many special articles, particularly in the *Military Surgeon* and the *Journal Royal Army Medical Corps.*)

Lecture IX.

Medico-Military Statistics. Influence of Age, Length of Service, Station and Race. Acclimatization in the Tropics.

General consideration of medico-military statistics, admissions, deaths, discharges, total losses, constantly non-effective, days lost.

Comparison of actual numbers lost from disease and from wounds. Not a just comparison. Rates per thousand of deaths give a truer idea of sanitary conditions.

Comparison of military and civil morbidity. Reasons for differences. Malingering. (M. M. D. 456-q.)

Military absenteeism. (Mil. Surg., June, 1912, p. 619.) Its cause and very great importance; relation of medical department to absenteeism. Methods of limiting this evil.

Influence on morbidity of season and locality. Influence of age.

Morbidity and mortality high among young soldiers.

Morbidity and mortality decrease with length of service. Demography. (Mil. Surg., 1916-1917.)

Mortality much higher for negro and Filipino troops than for white troops.

Influence of beriberi on Filipino races.

Influence of race on circulatory diseases, kidney diseases, rheumatism, respiratory diseases, venereal disease, yellow fever, beriberi, typhoid, alcoholism, sunstroke and frost bite, plague, smallpox.

Differences among branches of the Caucasian race.

Acclimatization in tropics, and influence of race on same.

(These subjects are covered in the standard text-books on military hygiene, particularly Munson's. Much valuable information on these matters is contained in the annual reports of the Surgeon-General of the Army and in various articles published in the *Military Surgeon.*)

Lecture X.

Military Weapons and the Character of the Wounds They Produce. Gas poisoning.

Definition of "gunshot wound" in military usage.

Development of the military rifle. Description of U. S. Army rifle,—a typical small caliber high-powered weapon. (Description in U. S. Magazine Rifle.)

Form and composition of bullets. Spitz bullets. (Lagarde, pages 1-113.)

Ballistics and danger zones. (Straub, pages 1-55.)

Influence of shape and composition on character of wounds produced. Spitz bullets not humane.

Machine guns.

Automatic pistols. Field guns.

High explosive shells and shrapnel.

Types of hand-grenades.

Terrestrial mines.

Bayonet wounds.

Character of wounds produced by round lead bullets, connoidal lead bullets and modern small caliber steel jacketed missiles.

Explosive effects and explanation of same.

Increasing importance of artillery wounds. Character of injuries from shell and shrapnel.

Grenade wounds.

Asphyxiating gas and treatment of condition. (Treatment Injuries in War, page 115; Fauntleroy, pages 26 and 116.)

Proportion of killed to wounded.

Proportion of wounds in different regions of body.

Percentage of recoveries.

(Much of this latter information has been obtained from current medical literature. Practically no official information in regard to European War is available.) (Most of the points in this lecture are covered by Lagarde's book on Gunshot Injuries.)

Lecture XI.

Nature and General Treatment of Wounds in War.

Symptoms of G. S. W.
Pain, shock, thirst and hemorrhage. Primary external and internal hemorrhage. Secondary hemorrhage.
Lodgement of missiles.
Factors influencing infection. Sources of contamination of wounds. Unfavorable environment favors infective process.
Gas-bacillus gangrene; favored by necrotic tissue and hematomata. Symptoms and treatment.
Tetanus.
Other infections.
Treatment of wounds in general.
First aid dressings. (M. M. D. pars. 945-946.)
Need of food.
Care of shell wounds.
Wounds of the head; importance of prompt operation.
Value of dental treatment.
Wounds of neck and spine.
Chest wounds and their treatment. Importance of rest.
Abdominal injuries. Difficulties of operative treatment in war.
Vascular injuries; frequence of traumatic aneurysms.
Joint injuries; benign with cylindro-connoidal bullets.
Compound fractures; great frequency and importance.
Points wherein military surgery differs from civil surgery.

(Most of these points are covered by Lagarde in Gunshot Injuries, 1914, Wm. Wood & Co., and in an article entitled Military Surgery, *Medical Times*, Jan., 1916. Special phases are covered by recent articles in various journals.)

Lecture XII.

Organization of the Army, Especially the Medical Department.

National land forces of the United States, regulars, militia, volunteers. (F. S. R. pars. 1-8.)
Officers, non-commissioned officers and privates. (A. R. pars. 7-12.)
Line and staff corps and departments. (Bulletin 16, W. D. June 22, 1916.)
Organization of a regiment of Infantry, regiment of light artillery.
The Coast Artillery Corps.
Brigades.
Staff Corps.
Quartermaster Corps.
General Staff Corps.
Mobile army.
Divisions.
Field armies.
Armies.
Lines of communications.
Organization and size of a division.

(All these are prescribed by Bulletin 16, W.D. 1916, and T. of O.)

Regimental Sanitary Detachment. Ambulance Companies. Camp Infirmaries. Field Hospitals. Evacuation Hospitals. Evacuation Ambulance Companies.
American National Red Cross Units.
Rest Stations. Base Hospitals. Base Supply Depots. Convalescent Camps. Contagious Disease Hospitals.
Hospital trains, boats and ships.
Casual Camps for sanitary troops.
Field laboratories.
Surgeon-General. Department surgeons. Division surgeons.

(All these medical department organizations are described in pars. 585-841 M. M. D.)

Lecture XIII.

Lines of Sanitary Aid in War. Drill of Sanitary Troops. Evacuation of Wounded.

"A." Zone of advance.
  Sanitary units concerned. (M. M. D. 586 and 627-750.)
  Regimental service.
  The sanitary train. (M. M. D. 651-715.)
  Division surgeon.
"B." Line of communication, advance, intermediate and base groups.
  Evacuation hospitals and evacuation ambulance company constitute sanitary column. (M. M. D. 751-756.)
  Base hospitals, convalescent camp, contagious hospital, hospital trains, boats and ships, casual camps, sanitary squads, field laboratories, rest stations, base and advance supply depots, evacuation hospitals and evacuation ambulance companies. (M. M. D. 757-827.)
"C." Service of the interior; general hospitals, camp hospitals, convalescent camps, supply depots, trains, etc. (M. M. D. 586.)
Drill for sanitary troops. (Drill Regs.)
Essential for prompt coöordinated action.
Dispositions in planned defense and in trench warfare.
Résumé of service in war. (M. M. D. 831-841.)

Lecture XIV.

Tactical Knowledge Needed by a Medical Officer. Map Problems.

Need of tactical knowledge by medical officer.
Influence of developments in armaments on function of medical department.
Tactical knowledge required.
Orders.
Specimen of field order. Paragraph 4.
Maps and map reading. (Sherrill.) Contours.
Shelter.
Angles of fire and overshots. Visibility.
Statistics as to number of wounded to be handled.
Classes of wounded: non-transportable, transportable and able to walk.
Amount of transportation allowed a division.
Time required to remove wounded. Formulas for same.
Map exercises.

(These subjects are covered by the following books: Field Service Regulations; A Study in Troop Leading and Management of the Sanitary Service in War, Morrison and Munson; Principles of Sanitary Tactics, Munson; Medical Service in Campaign, Straub.)

Lecture XV.

The Geneva and the Hague Conventions. The Red Cross Society.

Growth of humanitarianism in conduct of war.
Declaration of Paris, General Order No. 100.

Congress of 1863 in Geneva.
First Geneva Convention in 1864.
Second Geneva Convention in 1906.
Declaration of St. Petersburg.
First Peace Conference at The Hague in 1899.
Second Peace Conference in 1907.
The conventions formulated.
Poisoning and use of projectiles causing unnecessary suffering forbidden.
International authority of the Geneva and The Hague Conventions.
Details of Geneva Convention provisions.
Emblem and the marking of sanitary personnel and material.
Red Crescent. (Rules of Land Warfare covers all above points.)
Volunteer aid societies.
Convention at The Hague adopted the principles of the Geneva Convention to maritime warfare.
Marking of hospital ships.
American National Red Cross. (M. M. D. pars. 535-538.)
Units must be attached to armies and subordinate in order to military rules to receive recognition.
Functions of Red Cross. (M. M. D. par. 536.) (Act of Congress, January 5, 1905, 33 Stats. 300.)

LECTURE XVI.

Medico-Military Preparedness.

Our present military status.
Need of at least one million men if we are attacked.
Present inadequacy of Medical Corps.
Number of medical officers needed for administrative positions.
Sources of supply are Medical Corps, Medical Reserve Corps and Militia Medical Corps. They are insufficient. Medical Reserve Corps as yet little trained.
Fifty thousand to one hundred thousand enlisted men of the medical department needed.
No class in civil life trained for technical medical department duties.
Medical department work begins immediately on mobilization.
Shortage of independent sanitary units.
Reserve supplies inadequate through failure of Congress to appropriate money.
What has already been done toward medico-military preparedness; instruction for Medical Corps, Medical Reserve Corps and militia.
Council of National Defense.
What supplies we have ready.
Professional interest in preparedness.
Benefit to our surgeons of experience in European War.
Real preparedness demands larger Medical Corps; larger and better trained Medical Reserve Corps; larger enlisted force, Medical Department, and better pay for it; a reserve enlisted force, Medical Department; more dental surgeons; placing of supply depots at points safe from attack; obtaining of much larger reserves of supplies.

BOOKS REFERRED TO ABOVE IN ABBREVIATED FORM.

(All references to service manuals are by paragraphs.)

Drill Regs.—Drill Regulations and Service Manual of Sanitary Troops, 1914.
F. S. R.—Field Service Regulations, 1914.
A. R.—Army Regulations, 1913.
T. of O.—Table of Organizations, 1914.
M. M. D.—Manual Medical Department, 1916.
Bulletin 16, War Dept., 1916.
Rules of Land Warfare, 1914.
Description and Rules for Management of U. S. Magazine.
Rifle, Model 1903, Caliber 30, 1908.
Fauntleroy—Medico-Military Aspects of European War.
Quartermaster Manual.
Ordnance Manual.
Court Martial Manual.
Regulations for General Hospitals.

(*From Government Printing Office, Washington, D. C.*)

Lagarde—Gunshot Injuries, 1914, Col. Louis A. Lagarde, Wm. Wood & Co.
Treatment Injuries in War, 1915. Wyman & Sons, 28 Breams' Bldg., Fetter Lane C. C., London.
Mil. Surg.—The Military Surgeon, Washington, D. C.
Finger Prints—"Classification and Uses of Finger Prints," by E. R. Henry, Detective Publishing House, Chicago, Ill.
Military Hygiene, 1901. Col. E. L. Munson, Wm. Wood & Co.
Military Hygiene, 1914. Col. Valery Havard, Wm. Wood & Co.
Military Hygiene, 1909. Maj. P. M. Ashburn, Houghton, Mifflin & Co.
Military Hygiene, 1909. Col. A. E. Woodhull, John Wiley & Sons.
Mason's Handbook—Handbook for Sanitary Troops, 1917. Col. C. E. Mason, Wm. Wood & Co.
Moss—Field Service. Capt. J. A. Moss. Agents: U. S. Cavalry Association, Fort Leavenworth, Kansas.
Straub—Medical Service in Campaign. Col. Paul F. Straub, Blakiston's Son & Co.
Sherrill—Military Map Reading. Sherrill. Agents: U. S. Cavalry Association, Fort Leavenworth, Kansas.
Military Shoe—The Soldier's Foot and the Military Shoe. Col. E. L. Munson. Agents: Cavalry Association, Fort Leavenworth, Kansas.
A Study in Troop Leading and Management of Sanitary Service in War. Morrison and Munson. Agents: U. S. Cavalry Assication, Fort Leavenworth, Kansas.
Principles of Sanitary Tactics. Col. E. L. Munson. Agents: U. S. Cavalry Association, Fort Leavenworth, Kansas.

SYLLABUS OF LECTURES ON NAVAL MEDICINE AND HYGIENE.

By SURGEON G. F. FREEMAN, U. S. NAVY.

DATES OF DELIVERY TO UNDERGRADUATES OF THE HARVARD MEDICAL SCHOOL, TUFTS COLLEGE MEDICAL SCHOOL AND BOSTON UNIVERSITY MEDICAL SCHOOL, AND MEMBERS OF THE PROFESSION. 4.30 P.M.

Monday, March 26	Lecture	I
Monday, April 2	Lecture	II
Monday, April 9	Lecture	III
Monday, April 16	Lecture	IV
Monday, April 23	Lecture	V
Monday, April 30	Lecture	VI
—— ——	Lecture	VII
—— ——	Lecture	VIII

Naval Lecture I.

Naval Hygiene. General. Submarines and "Patrols."

Submarines, general qualities of.
"Patrol" boats, general, structure, size, equipment, etc., and manoeuvres.
Hospital Ships for work with the Naval Coast Defense Reserve.
Lantern slides, general views of Navy, with explanatory notes as to hygiene on board ship.

Naval Lecture II.

Preparation for Battle on Board Ship.

Organization, utilization, evacuation of wounded.
Demonstration of navy stretcher and "shell wound" dressings.
Preparation for battle; stations.
Disposition of Hospital Corps.
Instruction of crew.
Transportation of wounded and resuscitation of unconscious.
Location and functions of "dressing stations."
Detailed organization for relief of wounded on board ship.
Emergency drills.
Experience of English in naval battles.
First aid on patrol boats.

Naval Lecture III.

Hospital Ships. Construction. Functions. Hague Convention. Laws Governing Hospital Ships.

Functions of hospital ship, as the U. S. S. *Solace.*
General description and diagrams of plans of new hospital ship being built for the Navy.
Notes on transport ships.
"Rescue ships."
Hague Convention, rules, etc.
Special devices, as bunks, trays, lockers, for use on board ships.
Ambulance motor boats.

Naval Lecture IV.

Special Accidents and Diseases on Board Ship.

Description of diseases, including tropical diseases.
Notes on hygiene.
Notes on the physical examination of the "normal individual."
Aviation notes.
Intoxication by detonation on board ship.
Powders.
Gases, etc., carbon dioxide, nitrogen monoxide, etc.
Treatment of gas poisonings.
Ventilation and special submarine ventilation.

(Print of general ventilating system of submarine to each member of class.)

Naval Lecture V.

Additional Notes on Ventilation of Submarines. Purification of Air and Use of Oxygen. Special Features of Naval Life and Hygiene.

Lantern slides and illustrated pamphlet.

Naval Lecture VI.

Naval Medical Corps.

Organization and duties in general ashore and afloat.
Notes on hygiene of different types of ships, as submarines, torpedo boat destroyers, scout cruisers, battle cruisers, and battleships, with notes as to construction and size.

Naval Lecture VII.

Health of Navy and Naval Health Records.

Notes on recruiting.
Naval physical requirements and physical examinations.
Exact method of examining a recruit.

(A copy of Naval Health Record will be given to each member of class for reference during the lecture.)

Disabilities which disqualify for enlistment or enrollment.
Waivers on physical disabilities.

Naval Lecture VIII.

Daily Routine Duties of Medical Officers on Board Ship.

"Sick call," drills, etc.
Special duties ashore and afloat.
Duties as members of Medical Examining Boards.
Inspections.
Duties in regard to the health of the crew.

The following books can be used for reference:

Naval Hygiene. Gatewood, P. Blakiston Son & Co.
Handy Book, Hospital Corps, U. S. Navy, 1917 edition. Price, 50 cents. At the Naval Medical Supply Depot, Brooklyn, N. Y.
Naval Medical Bulletin. Published quarterly, under the direction of the Surgeon-General, U. S. Navy. Bureau of Medicine and Surgery, Navy Department, Washington, D. C. Can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C. Subscription, $1 a year; single copies, 25c. It is furnished free to members of the Naval Medical Corps and the Naval Coast Defense Reserve.
Military Surgeon. Army Medical Museum, Washington, D. C. By membership in the Association of Military Surgeons of the U. S., or subscription, $3.50 a year; single copies, 40 cents.
Braisted—Naval and Medical Sanitary Features of the Russo-Japanese War. Government Printing Office, Washington, D. C.
Physical Examination of Recruits. Circulars, etc. Bureau of Medicine and Surgery, Navy Department, Washington, D. C.
Fauntleroy—Medico-Military Aspects of the European War. Government Printing Office, Washington, D. C.
Instructions Medical Corps, U. S. Navy. Bureau of Medicine and Surgery, Navy Department, Washington, D. C.

Note.—Officers in the Naval Coast Defense Reserve, Class 4, will be furnished certain books and circulars of instruction on application to the Bureau of Medicine and Surgery, Navy Department, Washington, D. C., as "Naval Medical Correspondence Course"; "Extracts from U. S. Navy Regulations and Navy Instructions" (Government Printing Office via the Bureau of Medicine and Surgery). Reference handbooks, as first aid and hygiene, are issued to ships on fitting out and to permanent shore stations, but not to temporary recruiting or enrolling offices.

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ERNEST GREGORY, *Manager*,
126 Massachusetts Ave., Corner Boylston St., Boston, Massachusetts.

THE MASSACHUSETTS GENERAL HOSPITAL.

THE one hundred and third annual report of the Massachusetts General Hospital, now published in two volumes, makes the following statement regarding its financial situation: "The trustees are most grateful to all the friends who by their generous gifts have helped on the work of the hospital during the past year, but it is necessary to call the attention of the community to the great needs of the hospital, and its very serious financial danger. Not only has the increased cost of everything used increased the financial burden, but a more complete medical care involves a larger expenditure. Added to this, there has been an attempt to impose on the hospital a tax amounting to $53,000, litigation as to which is now pending. This attempt involved, your Trustees believe, a departure from the policy which has existed in this Commonwealth from early days, and is a direct menace to every charitable and educational institution in the State. The result of all the causes above referred to, is a deficit in the current expense account of about $202,000, or, if we omit the $53,000 paid for taxes, then the deficit is $149,000. The Trustees believe that the vital character of the service rendered by the hospital, its far-reaching influence for good, and the thoroughness and effectiveness of its work, affecting as it does, directly or indirectly, the health and safety of the whole community, constitute the strongest reasons for a liberal and increased support, and if the service hitherto rendered by the hospital is to be continued, the expense cannot be diminished, and a large endowment is a matter of necessity."

The year past has seen the dedication of the Moseley Memorial Building and the operation of the Consultation Clinic, which was established to give to patients who desired to pay for their medical care, but who were not able to afford the services of specialists and the use of the expensive and complicated apparatus possessed by a great hospital, the same privileges enjoyed by those who do not pay. The Clinic has achieved a real success, and has proved itself of value to the great majority of physicians who have used it. One thousand four hundred and eighty-six patients have been referred to this clinic by 687 physicians. It is hoped that in the future some beds can be established for patients of the same class. In 1864 the trustees of the General Hospital spoke of the possibility that in the future a building might be erected by the hospital and devoted to pay patients, for whom the hospital has always made some provision, such building to combine the comforts of a home with the advantage of being attached to a well-appointed and well-regulated hospital. The trustees feel that the time has now arrived for such a building, and that there is no reason why persons of means should be debarred from the hospital privileges which are accorded to those without means. A pay ward is accordingly in process of construction and will probably be ready for use in the present year. Here patients may employ their own physicians, but get the benefit of connection with the hospital, and reimburse the hospital for all its expense. The hospital will thus be giving the use of its facilities to all portions of the community, but, besides such direct service, it is already benefiting the whole community through the training which it gives to surgeons, physicians, and nurses for future work in private, institutional, or social service, and also through the research work which it is carrying on, and which inures to the benefit of all mankind.

Another branch of public service has been developed during the past year by the establishment at the hospital of the nucleus for a base hospital. This has been organized under the Red Cross, and consists of a medical staff of 26 physicians, 2 dentists, 50 nurses, 25 nurses' aids, 25 in reserve, 1 chaplain, 77 male administrative personnel, and 14 civilian employees. There can thus be automatically provided a 500-bed base hospital for the service of the government.

Attention is also directed to the need of a new home for convalescents, particularly persons with moderate means, as an essential adjunct to the hospital.

> "This building should be erected in connection with the General Hospital, for patients who should pay something to the physicians for their medical and surgical care, but who are unable to pay the full price for care in the new private ward which we are building. Such a hospital would meet a want which is greatly felt, as people of moderate means are getting today the least efficient care in case of sickness of any class in the community. This group of individuals must often be ill in their homes, dependent upon physicians who cannot provide the necessary laboratory tests and scientific examinations which are readily available in a general hospital. I would make an urgent appeal to the generosity of the community for a special gift to erect and endow a building for this object."

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THE CENTRAL CONTROL OF REFLEX ACTION.

Many of our faculties whose powers are credited to inherent special constitution, and whose control is attributed to reflex mechanisms, are the results almost entirely of actions subordinated to the higher centres. They are expressions of the mind formed as a result of stimuli received therein through normally acting senses, together with either the conscious or subconscious,—but always positive,—effort to discipline the senses to harmonize in the accomplishment of an end—the development of the mind. Education is not merely an aimless abstract attempt to stimulate the brain through the senses with a great variety of stimuli, that is, with funds of information, but rather to make the senses thus stimulated harmonize and coöperate in their action to the end of impressing the mind and developing the brain. Unless there is this discipline of the senses and harmony of the centers during action, and, above all, a curbing of their individual exuberances, mental disturbances must inevitably occur. It is the fault of many of the methods of modern education that there is a lack of harmony in the nature of the facts and theories taught, and in the general lack of understanding of the absolute necessity for discipline and harmony in the normal mind and body, just as it is necessary for the integrity of the social body. No mind is more poorly trained than one which has acquired a heap of facts but with little interrelation.

Apparently, while the discipline of the centers and the senses results in the ability to do things with more ease and without so much conscious or deliberative effort—in other words, while proper education apparently reduces central action or knowledge to reflex or spinal action—it is really not so; the central is as much as ever in control, but acting subconsciously, from habit, so to say. On the contrary, the greater the mental development, the more reflex spinal actions are rendered central or conscious. Even if a particular action would have taken place from reflex or spinal control, its transfer to central control is an advance in the development of the individual. Education, then, in its relation to mental development, has for its main object the transfer of reflex action to central expression. Education makes conduct and action subconscious in control, but not, as appears on the surface, reflex in nature.

In proper discipline of the senses, every individual sense is subordinated to the sense in action. Any individual reflex tendencies which might disturb this harmony is suspended. A trained observer sees more than an untrained one, even though the former has very much less acute vision, because he has succeeded in disciplining all the senses, no matter what their ordinary functions, to suspend all individual action to help him see. The more central is the control under which we act, the more deliberate are our actions, and, of course, the more efficient. Moreover, reflex action and emotion go hand-in-hand. Indeed, the expression of emotion may be called an inner reflex action. In the same manner as when our actions are influenced by an undue amount of the reflex, our deliberation may be influenced by an undue amount of emotion; and both are rendered by them the less trenchant. Just as we are trying to be ruled less by the reflex in action, just so we are trying to replace and to convert emotion into conscious deliberation.

There is hardly an action of whatever kind or in whatever individual, no matter what his mental development, and no matter how reflex and automatic it appears, that is not more or less under central control. Even in such spinally controlled actions as the sphincteric and the sexual, there is more central control than is commonly understood. The evolution of the human species tends here especially to a greater control and a more rapid eradication of the reflex influences. The sole activity of the spinal cord—the seat of reflex control—does not suffice for reflex function. If it did, these reflexes would occur with the same force and with the same rapidity, even when the higher centers were engaged. This, of course, is not so. In the case of the sexual reflex, there is no greater stop to it than to have the mind otherwise engaged. When the mind is not in actual control there is little likelihood of the "independent" spinal reflex sexual action. The same is too often true of the vesical and rectal functions—and with bad results. Constipation, for example, is as much a mental as a physical condition. In general it can be said that reflex action is suspended directly in proportion to the intensity with which the mind is occupied and not in control.

It is the aim of the medical profession to advise and to urge as their share of contribution to the physical and mental development of the human species,—and its evolution,—the training out of the reflexes in favor of central, conscious control, the training to greater disipline and harmony of all the senses and centers, and, finally, the training to greater scope of individual senses as well as a training of all individuals for better discipline generally.

PREPARATION IN MILITARY AND NAVAL MEDICINE.

At a recent meeting of the Sub-Committee on Military Education and Training Camps of the Auxiliary Committee of National Defense of Boston, it was decided to urge the Secretaries of the various District Societies in Massachusetts and the neighboring states to attempt some definite line of work in connection with instruction in military medicine.

We are told that the proportion of medical men from Massachusetts alone will be approximately one thousand men. This means that we must have a marked increase of the number of enrollments in the Officers' Reserve Corps.

In order to render efficient service, it would seem best to procure the services of some retired officer or member of the National Guard or other individual qualified to assume charge, and under his direction conduct a series of meetings for instruction purposes. In this connection, the committee offers a syllabus of the lectures being given under the auspices of the Harvard Graduate School of Medicine by Lt. Col. Weston P. Chamberlain of the Medical Corps, U. S. Army, and by Surgeon G. F. Freeman, U. S. Navy. This syllabus might well be used as a basis for the suggested course, although local conditions may necessitate a considerable departure from the actual course outlined.

The syllabus of these lectures on military and naval medicine and hygiene is published in full in another column of this issue of the Journal, and later will be available in reprint form.

THE PARTICULAR ATTENTION OF THE SECRETARIES OF DISTRICT MEDICAL SOCIETIES IS HEREWITH CALLED TO THIS MATTER, WHICH IS OF VITAL IMPORTANCE IN THE PRESENT EMERGENCY. ESPECIAL ATTENTION IS DIRECTED ALSO TO THE MATERIAL OF THE FOLLOWING EDITORIAL NOTICE.

CARD CATALOGUE OF MASSACHUSETTS PHYSICIANS.

Sub-Committee No. 1, on Mobilization of the Medical Personnel of Massachusetts, is working together with the Sub-Committee of the Massachusetts Committee for Public Safety, in an effort to obtain a complete card catalogue of every physician in Massachusetts. We desire, through these columns, to emphasize the importance of this catalogue and to beg every physician to fill out completely the card which he will shortly receive, and mail it as soon as possible in the enclosed addressed envelope.

The great need continues to be for additional doctors in the regular Medical Corps of the Army and of the Navy, and in the Reserve Corps of the Army and the Navy, and the most important duties for the immediate future will be in the matter of examining recruits. Those who cannot volunteer can help greatly by taking charge of the patients of absent doctors and dividing the fees in equal shares with the families of the doctors who have gone to the front. All can aid materially by joining the Red Cross organization.

From time to time further communications will appear in the BOSTON MEDICAL AND SURGICAL JOURNAL.

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MEDICAL NOTES.

FORTHCOMING MEETINGS.—The American Pediatric Society will hold its twenty-ninth annual meeting at the Greenbrier, White Sulphur Springs, W. Va., on May 28, 29, and 30, 1917. An interesting program has been arranged. Boston men who will read papers are Dr. J. L. Morse, Dr. S. B. Wolbach, Dr. Charles Hunter Dunn, Dr. Fritz B. Talbot and Dr. Richard M. Smith.

The annual meeting of the Alienists and Neurologists will be held in Chicago, Ill., July 10, 11 and 12, under the auspices of the Chicago Medical Society. A program covering the subjects of hospital care of the insane and various aspects of insanity is being arranged.

WAR NOTES.

WAR RELIEF FUNDS.—On April 21 the totals of the principal New England relief funds for the war reached the following amounts:

Belgian Fund	$811,792.71
French Wounded Fund	218,010.31
Armenian Fund	177,271.33
French Orphanage Fund	93,447.64
Boston Ambulance Fund	73,519.43
Polish Fund	68,570.72
Massachusetts Red Cross	54,391.58
LaFayette Fund	26,548.03
French Phthisis Fund	13,661.04
Friends' Relief Fund	12,445.77

PREPARATION AT COLUMBIA.—Columbia University has offered to erect a great emergency hospital on Columbia Oval in the Bronx, with accommodation for 1000 beds. It is planned to teach military surgery and camp organization at the hospital. Dean Lambert has stated that the college would be willing to graduate its senior class in January next, instead of May, in order to release its students for field service. Boards and committees have been appointed for the enlargement of St. Luke's Hospital, and are called St. Luke's Hospital Auxiliary for Home Defence. The general purpose is to make the Hospital similar to the American Ambulance in Paris. Columbia University has donated part of its South Field for the use of the Hospital.

Through its board of directors, the New York Ophthalmic Hospital has offered the use of its buildings and equipment to the Secretaries of War and Navy, "together with the services of such members of the attending surgical staff as may be desired for the treatment of diseases and injuries of the eye, ear, nose and throat."

RELIEF WORK IN BELGIUM.—The following statement, made in London, at the headquarters of the Commission for Relief in Belgium, has been given out by the Associated Press:

"We can state positively that not a single carload, much less a trainload, of the commission's provisions, once started for Roubaix, or any other town occupied in France, ever failed to arrive. Not only is this true, but the actual figures of the receipt and consumption of the food made out and attested by the French local committee at Roubaix and checked by the commissions of foodstuffs sent in by the commission correspond within a few pounds in the total of many tons with the figures of the amount of foodstuffs forwarded by the commission from Holland and Brussels to this district.

"In fact, the total receipts of the whole 1,882 French communes provisioned by the commission show a loss of but two-tenths of 1% on 485,000 tons of foodstuffs sent in by the commission from Holland and Brussels

"With regard to the statement of Mr. Whitaker, that the Germans had taken American white flour and substituted rye flour adulterated with sawdust, the facts are as follows:

"This German flour was not substituted for any American flour, but was provided by the Germans from the native French crop as an addition to the American ration, and was the same flour mixture of rye and wheat as furnished to the German soldiers. This addition amounted to 100 grammes daily per person until November, 1916, and now is 180 grammes daily.

"The commission feels that the dissemination of unverified reports of this kind tends to destroy the confidence of the charitable world in the work of distribution and, therefore, directly decreases the amount of food sent to these people, who, even according to Mr. Whitaker's reports, would be starving but for this food."

DEDICATION OF RED CROSS BUILDING.—The dedication of the new $800,000 American Red Cross building in Washington will take place on May 12. The occasion will mark the first mobilization of uniformed women war workers ever held in the United States. The women will wear for the first time the new uniform which is to be adopted for home service of the Red Cross. A notable feature of the program will be the dedication of the three memorial windows given to the Red Cross by the women of the civil war organizations. One window is the gift of the United Daughters of the Confederacy, another the gift of the Women's Relief Corps of the North, and the third window is the gift of both organizations.

Beth Israel Hospital Offers Service.—The executive board of the Beth Israel Hospital Association, Boston, has voted to place the facilities of the institution at the disposal of the federal authorities in caring for sick and wounded soldiers and sailors. The medical staff comprises some of the leading physicians and surgeons of the city.

Harvard Dental Unit.—The unit at the Harvard Dental School has cared for the teeth of 300 National Guardsmen. More than 1000 fillings have been inserted, while teeth that could not be saved were extracted by the regular surgical staff. During the Easter vacation there will be a clinic for the exclusive use of the soldiers. All members of the profession who wish to volunteer to do work for the soldiers in their private offices should send their names to George H. Payne, 29 Commonwealth Avenue.

Conference in Aid of American Red Cross.—President Wilson has invited a group of leading men from different parts of the country to meet in Washington, April 21, to consider means of financing the American National Red Cross for its responsibilities toward soldiers and noncombatants. The President proposes to designate a day in May on which the entire nation shall concentrate its attention toward this matter. F. L. Higginson, Jr., will represent Boston.

BOSTON AND MASSACHUSETTS.

Week's Death Rate in Boston.—During the week ending April 7, 1917, the number of deaths reported was 256, against 245 for the same period last year, with a rate of 17.28, against 16.80 last year. There were 43 deaths under one year of age, against 35 last year, and 82 deaths over 60 years of age, against 71 last year.

The number of cases of principal reportable diseases were: diphtheria, 79; scarlet fever, 36; measles, 188; whooping cough, 4; typhoid fever, 4; tuberculosis, 48.

Included in the above were the following cases of non-residents; diphtheria, 11; scarlet fever, 9; measles, 3; tuberculosis, 11.

Total deaths from these diseases were: diphtheria, 9; tuberculosis, 31.

Included in the above were the following deaths of non-residents: diphtheria, 3; tuberculosis, 2.

Milford Hospital.—Milford Hospital is to have a new ward for maternity cases. Mr. and Mrs. B. H. B. Draper have offered to stand the expense of changes necessary to accomplish this end.

Psychopathic Hospital at Sherborn.—Efforts are being made to establish a hospital for the care and study of psychopathic women in connection with the Reformatory for Women at Sherborn.

Boston City Hospital.—A department devoted to the scientific treatment of delirium tremens and a maternity ward with adjoining nursery are proposed to be established at the Boston City Hospital. Plans are also proposed to open in West Roxbury, the first hospital in America devoted entirely to the treatment of whooping cough.

Brockton Hospital.—Dr. Joseph H. Lawrence has been elected a member of the medical staff of the Brockton Hospital to fill the vacancy caused by the death of Dr. A. V. Lyon.

Epidemics in Various Towns and Cities of Massachusetts.—Measles has been epidemic in New Bedford and Randolph; both measles and mumps exist in Northampton. Ashburnham has an epidemic of mumps and Brockton reports 96 cases of mumps and several cases of scarlet fever. Scarlet fever rages in Middleboro, and diphtheria is somewhat prevalent in Natick.

Salem Hospital.—The annual report of the Salem Hospital shows a total of 1,369 treated during the year, only 86 of which died. There were 171 births.

Baby Hygiene Association.—At the annual meeting of the corporation of the Baby Hygiene Association held on March 27, the following officers were elected:

Dr. John Lovett Morse, president; Charles E. Mason, vice president; Hugh Nawn, secretary, and Charles E. Cotting, Jr., treasurer.

Mrs. Henry Copley Greene, Miss Esther G. Barrows, Ernest B. Dane and John W. Hallowell were elected members of the board of trustees for three years. Dr. Ralph C. Larrabee, Seymour H. Stone and Miss Katherine P. Hewins were elected members of the corporation.

Wing Memorial Hospital.—The Board of Managers of the Wing Memorial Hospital, Palmer, recently organized with Dr. M. B. Hodskins, chairman. Dr. W. B. T. Smith, of Bondsville, was elected to fill a vacancy on the board caused by the resignation of Dr. Damon of North Wilbraham.

Noble Hospital.—The hospital aid association has started a campaign for the proposed nurses' home at the Noble Hospital, Westfield.

Measles in Merrimac.—One hundred and twenty-five cases of measles have been reported in Merrimac this winter.

Springfield Physicians in Hospital Reserve.—Ten Springfield physicians have been given commissions as first lieutenants in the medical officers' reserve corps of the United

States army. They are Drs. H. F. Byrnes, P. M. Cort, E. L. Davis, J. W. Maloney, Philip Kilroy, Charles F. Lynch, James E. Quinn, Erdix T. Smith, Arthur Horrigan and John M. Tracy. Two from Chicopee, Medical Examiner John C. Gallagher and Associate Medical Examiner L. E. Mannix, have also received commissions of this sort. Dr. George Corcoran and Dr. Edward Holton, of West Springfield, are on the navy reserve list. Among those who are now making applications to take the examination for appointment to the corps are Drs. George L. Schadt, Richard J. Rockford, and City Physician William J. Leonard.

SCARLET FEVER IN WINTHROP.—Some 20 cases of scarlet fever have been reported in Winthrop, but none are looked upon as serious.

Miscellany.

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Report of the Medical School Committee.

To the Medical Board,
Council of National Defense:

Gentlemen: Your committee, after consultation with the Surgeons-General begs leave to submit the following report:

In your effort to solve the urgent problem before this Board and assist the Surgeons-General in supplying an adequate number of Medical Officers for the Army and Navy, it is important that this country should not repeat England's blunder at the outbreak of the war in permitting the disorganization of the medical schools either by calling the faculties into active service or sanctioning the enlistment of medical students into any of the line organizations. Ordinary foresight demands that we face the possibility that the war upon which we have entered may last for years. Medical schools to supply trained men for the future as well as the present emergency must be kept in active operation under any circumstances.

While aiding to the uttermost in overcoming the present shortage of men, the necessity of keeping the source of supply open emphasizes the importance of conserving our raw material. Therefore, men now in college looking forward to medicine as a career should be made to understand that it is their patriotic duty to the nation at this time to continue their studies and enroll in the medical school of their choice. Furthermore, no medical student who has not completed three years of medical work should be permitted to give up his course, as the country needs his trained and not his untrained service.

There are, however, ways in which the medical schools can help the present situation. The following suggestions are made for your consideration and action:

(1) Medical schools should be prepared to graduate senior medical students promptly in case of need. The faculties should urge all graduates who can be relieved of their obligations as internes in civil hospitals to enroll in the Medical Corps of the Army and Navy.

(2) Medical schools should be encouraged to consider as a form of service, the Italian plan by which Base Hospital Units can be organized through the Red Cross. These military hospitals carry with them the clinical faculty and students as medical personnel. This type of organization meets two ends—practical help can be rendered to the Army or the Navy in time of war, and instruction may be continued at the Base. This permits the graduation of men directly into the Junior grades of the Army after the most practical form of military instruction.

(3) Fourth-year students may be allowed to substitute, in special cases, service in a Base Hospital for the fourth year in the hospital at home when opportunities are offered for instruction in such military institutions.

(4) Medical Schools that do not adopt the Italian plan should be prepared to reduce the faculties to the minimum required for routine work and enroll all men so liberated in the Medical Officers Reserve Corps.

To put these recommendations into immediate effect, the Committee suggests that the Council of National Defense send the following telegrams at once:

To the Deans of All Medical Schools:

National safety demands that medical schools continue in full operation during the period of war. All medical students until the fourth year is reached should be discouraged from enlisting at present in any line of sanitary organization. Letter follows with particulars. Urge your coöperation in following suggestions contained therein to overcome present shortage of medical men. Please answer. Not for publication.

(Signed) Franklin Martin,
Council of National Defense.

To the Presidents of all Colleges and Universities:

National safety demands that all undergraduates planning to study medicine should enroll in the Medical School of their choice at earliest possible moment. Letter with particulars follows. Urge your coöperation. Please answer.

(Signed) Franklin Martin,
Council of National Defense.

Respectfully submitted,

Arthur Dean Bevan,
Thomas W. Huntington,
Edward Martin,
Charles H. Peck,
Winford Smith,
Joseph Marshall Flint, *Chairman,*
Committee on Medical Schools.

Report of the Hospital Committee.

The Hospital Committee met and considered the question of how and along what lines it might be of service, and after consultation with the Surgeon-General of the Army, begs to submit the following:

Inasmuch as it appears that at this time the matter of prime importance is the release of men from civil duties for service in the Medical Reserve Corps of the Army and Navy, it is recommended that the Hospital Committee be authorized to communicate with all general hospitals throughout the country having a capacity of 100 beds or over, urging the need of every available man for the Reserve Corps and requesting that the authorities of each hospital reorganize the Staff, to the end that as many men may be released as possible, and that a list be submitted to the committee specifying:

1st. The members of the Staff needed to carry on the work in the civil hospital.
2d. The members of the present Staff who can be spared.

This second group to be divided into:

(*a*) Those now members of the Reserve Corps.
(*b*) Those not members, but who are willing to become members of the Reserve Corps.
(*c*) Those not members, who require persuasion.

As soon as this list becomes available, it is to be placed in the hands of the Surgeon-General. It is believed that such a list will be of value: First, as representing an organization which will safeguard the Civil Hospitals, which is of vital importance. Second, it will supply a list of available men, who are willing to enter the Reserve Corps. Third, it will supply a definite list of available men upon whom pressure should be brought to bear. It is believed that the handling of the matter in this way will allay the fears with regard to the interests of Civil Hospitals, which now is a deterrent factor and release a large number of men who would otherwise not be available, or who would be slow to respond. Furthermore, it is understood that it would be of great assistance to the Surgeon-General's office.

The Committee would recommend that those men who are selected to remain at home as represented by approved lists, should be furnished with some emblem to signify that they are recognized as serving their country by performing the home duties.

The second matter considered and recommended herewith was that a selected list of hospitals be prepared, with reference to size, location near terminal facilities or strategic points, as, for example, the hospitals of the important points along the Atlantic and Pacific Coasts and the Northern and Southern Borders. Information should be obtained from these hospitals as to what facilities they would place at the disposal of the Government in case of need, the possibilities of expansion, amount of ground available for expansion, whether maintaining convalescent branches or not, and the ease with which water, heating and sewage connection could be made in the event of expansion. This list would supply to the Surgeon-General's office a list of approved hospitals available for convalescent military hospitals or for such other purpose as might be necessary.

The third point considered was the ultimate need of hospitals or facilities for handling special lines of medical and surgical work, such as neurological, orthopedic, urological, shell shock hospitals, etc. It is felt that by listing the special lines for which provision should be made and the hospitals equipped for such service, valuable information will thus be made available, and that the committee in performing this work may also serve as a buffer between the Surgeon-General and his Staff, and the large number of those who may have pet projects to propose.

Your Committee suggests that if it meet with your approval, authority be given to proceed with the work as outlined. The Committee is ready to extend its functions as occasion demands.

Respectfully submitted.

THOMAS W. HUNTINGTON,
ARTHUR D. BEVAN,
FREDERIC WASHBURN,
JOSEPH FLINT,
EDWARD MARTIN,
CHARLES H. PECK,
WINFORD SMITH, *Chairman.*

SOCIETY NOTICES.

THE AMERICAN GASTRO-ENTEROLOGICAL ASSOCIATION.—The twentieth annual meeting of the American Gastro-Enterological Association will be held at the Hotel Traymore, Atlantic City, N. J., April 30 and May 1, 1917. Physicians are cordially invited.

FRANKLIN W. WHITE, *Secretary.*

NATIONAL ASSOCIATION FOR STUDY AND PREVENTION OF TUBERCULOSIS.—The annual meeting of the National Association for the Study and Prevention of Tuberculosis will be held in Cincinnati, Ohio, from May 9th to 11th.

ESSEX NORTH DISTRICT MEDICAL SOCIETY.—Annual meeting of the Essex North District Medical Society will be held in Russell Hall, Y. M. C. A. building, 40 Lawrence Street, Lawrence (Tel. 1260) Wednesday, May 2, 1917.

Dinner will be served at 12.30 o'clock sharp.

After the dinner the business meeting will occur at 1.45.

W. H. Merrill, M.D., of Lawrence, a member of the Committee on Industrial Health Insurance, of the parent society, will make a brief report on the committee's work.

Papers will be presented as follows: F. H. Lahey, M.D., of Boston, upon "The Surgical Treatment of Thyroid Diseases" (30 minutes); G. M. Atwood, M.D., of Haverhill, upon "Goitre as Seen by the General Practitioner" (15 minutes).

The discussion will be opened by D. Macdougall, M.D., of Haverhill. General discussion is desired. (All discussions 5 minutes.)

W. P. Bowers, M.D., of Clinton, a member of the Advisory Board of the BOSTON MEDICAL AND SURGICAL JOURNAL, on the part of the Massachusetts Medical Society, will outline the policy of the JOURNAL and explain how Fellows may aid the State Society through its official organ (10 minutes).

Next meeting of the Censors will be held at Hotel Bartlett, Haverhill, Thursday, May 10, 1917, at 2 o'clock sharp (Tel. 8710). Candidates for admission to the society should bring their diplomas.

F. B. PIERCE, M.D., *President,*
J. FORREST BURNHAM, M.D., *Secretary.*

NEW ENGLAND PEDIATRIC SOCIETY.—The forty-ninth meeting of the New England Pediatric Society will be held in the Boston Medical Library, Friday, April 27, 1917, at 8.15 P.M.

The following papers will be read:

1. Treatment of Eczema.
Charles J. White, M.D., Boston.
2. Mechanisms of Defense and Serum Treatment of Poliomyelitis. Harold L. Amoss, M.D., New York.

Discussion opened by Eugene R. Kelley, M.D., Boston, Francis W. Peabody, M.D., Boston, and Edwin H. Place, M.D., Boston.

Light refreshments will be served after the meeting.

MAYNARD LADD, M.D., *President.*
RICHARD M. SMITH, M.D., *Secretary.*

SUFFOLK DISTRICT MEDICAL SOCIETY. CENSORS' EXAMINATION.—The Censors of Suffolk District will meet to examine candidates for admission to the Massachusetts Medical Society at the Boston Medical Library on Thursday, May 10, 1917, at 4 P.M. Candidates, who must be residents of the Suffolk District or non-residents of Massachusetts, should make personal application to the secretary, and present evidence of their graduation from a recognized medical school, at least three days before the examination.

For further particulars apply, between 4 and 5 P.M., (except Saturdays and Sundays), to

DAVID CHEEVER, M.D., *Secretary.*
355 Marlborough Street, Boston.

HAMPDEN DISTRICT MEDICAL SOCIETY.—The annual meeting of the Society will be held at Hotel Worthy, Springfield, Mass., on Tuesday, April 24, at 4 P.M.

Regular business and election of officers for the ensuing year.

Papers for the afternoon:

"Remarks on Blood Pressure" Dr. G. D. Henderson
"The Cardio-Vascular System" Dr. E. A. Bates

Discussion by Fellows.

Dinner at 6 P.M. at expense of Society.

Censors meet for examination of candidates at Hotel Worthy on Thursday, May 14, 1917, at 4 P.M.

HERVEY L. SMITH, M.D., *Secretary and Treasurer.*

The nineteenth annual meeting of the American Proctologic Society will meet in Hotel Astor, New York City on June 4 and 5. The profession is invited to attend the sessions of the Society.

ALIENISTS AND NEUROLOGISTS.—The annual meeting of Alienists and Neurologists will be held Monday, July 9th, to Thursday, July 12th, 1917, in the Red Room, LaSalle Hotel, Chicago, under the auspices of the Chicago Medical Society. Dr. George A. Zeller will act as Chairman. The program will be mailed June 28th, with abstract of each paper. Contributors to the program are solicited. This is a society without a membership fee. Address, Secretary A. and N., room 1218, 30 N. Michigan Ave., Chicago.